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## PERSONALISM, THOMISM AND EPISTEMOLOGY



### I

THE latest newcomer to the philosophical forum has been proclaimed by its adherents as "a philosophy of the person." Personalism, announced in two continents as a complete philosophy, is, according to its exponents, the answer to the need of the hour, and already claims the support of respectable philosophical authority. It envisages the problem of personality in its broadest perspective, placing it within the framework of a complete philosophical system. From this central concept it seeks a solution of the problems of knowledge and being, of psychology and axiology. Primarily, it presents an interpretation of reality. From the point of view of development, we may distinguish two phases: naïve Personalism and critical Personalism. Naïve Personalism is simply the primitive, unphilosophical interpretation of reality, the product of a mind in Comte's "theological stage" of human development. Having once made the distinction between subject and object, it sees everything under the aspect of person-

ality. In the background of the world of objects it places demons, gods, spirits of various kinds.

Clearly, such a view is the antithesis of impersonalism. But its uncritical procedure is obviously insufficient to safeguard vital human values from the attacks of impersonalism. To achieve its object, it needs a rational explanation and development, which it finds in critical Personalism.<sup>1</sup> Critical Personalism, endeavoring to safeguard vital human values, is eclectic: it retains what seems true in the conclusions of naïve personalism and impersonalism. From the former it takes its teleological view of the universe which sees in it an orderly system of autonomous and purposive beings, organized in a hierarchy of persons. From impersonalism it borrows its scientific concepts and its "synoptic" or synthetic method.<sup>2</sup>

The synoptic method, so common in Personalism, is a reflection of modern trends in psychology. In effect, the principle underlying the method declares that we can know an object as a whole of parts, or as a part of a whole, or as both. William Stern, the German personalist, has developed the theory of synopsis in both directions. He has insisted that synopsis everywhere precedes analysis, and that synopsis reveals or contains more than analysis can ever discover. The former thesis he takes as proved by the Gestalt psychology. The totality of our inner experience—the Ego or "I"—is itself a unity, for synopsis is the normal mode of experience: elements are but abstractions from it. In his criticisms of the "Elementarist" psychologies, he has insisted that analysis, as a work of dissection, can never discover a Gestalt quality, which disappears as soon as it is resolved into its elements. Again, synthesis, by working upon a previously known whole, can discover therein a new form: by altering the contour, the lines, the lights and the shades it can discover a new Gestalt and a new beauty.

But synopsis is also a knowledge of an object as a part of a

<sup>1</sup> Cf. W. B. Thorp, "Mechanism or Personalism," *The Personalist*, XIII, 1932, pp. 200-205.

<sup>2</sup> Lewis W. Beck, "The Method of Personalism," *The Personalist*, XIX, 1939, p. 371.

whole. "To regard every object as a whole is to neglect the essential partiality of every object except the universe itself."<sup>3</sup> Though an object may be, metaphysically, an individual, this does not prevent it from being related by activity to another individual of which it is a subordinate part. Personalists, then, insist on the necessity of synopsis as a method of knowledge. Our earliest as well as our latest concepts, they teach, deal with things as wholes: with situations which are wholes; with ourselves as members of a social order; with our inner life, which reveals itself as a whole. The mind perceives situations as wholes, and there is comprehension before it is expressed in articulate language.

In his "personalistic" psychology, Stern has exploited to the full the method of synopsis. "The methodological requirement," he tells us, "that scientific psychology always preserve the correlation between part and whole, salience and ground, analysis and totality, applies without exception."<sup>4</sup> Thus the search for elements is replaced by a probing for "wholes," on the principle that everything mental is either a whole or a part of a whole. The quality of wholeness does not necessarily exclude an internal multiplicity of parts: these simply lose their character of independent parts, capable of existing by themselves. Stern repeatedly insists that the meaning of the part is found only in the whole, and he has extended the part-whole relationship further than most pluralistic philosophers. The synoptic method takes account of the relation of wholes to more inclusive wholes (e.g. that of man to society), without reducing the former to the status of a mere homogeneous part. When one whole transcends another, the meaning of the latter is not necessarily exhausted in its character of part.

The use of the synthetic method is not without its difficulties. Underlying Stern's method is the theoretical assumption that everything mental is at the same time personal, and everything personal is a whole or a part of a whole. This assump-

<sup>3</sup> Lewis W. Beck, art. cit., pp. 374-375.

<sup>4</sup> W. Stern, *General Psychology*, pp. 14-15.



tion seems to be a presupposition of the Gestalt and of all structural psychologies. But it is an assumption that must not be made too easily. To assume a Gestalt everywhere is to fall into the fallacy of over-simplification. Reality is complex and is not readily fitted into preconceived mental moulds. To ascribe every element to a Gestalt is to endow many things with qualities which they do not really possess. The synoptic method is really a process of abstraction which substitutes for the complex pattern of relationships found in the real order another purely theoretical and schematic system of relationships. It is an error of oversimplification to identify the latter with that which obtains in reality.

## II

Every philosophical system must present a theory of ultimate reality. And for Personalism the chief task is the presentation of a "metaphysics of the person," the ultimate principle of reality. But as epistemology logically precedes metaphysics, the philosopher must first elaborate a theory of knowledge.<sup>5</sup> For the Personalist, epistemology furnishes the basis for a theory of the person and, in this rôle, forms an essential part of his system. Stern goes even further. The "Erkenntnis-theorie," which stands at the beginning of his Critical Personalism, is much more than an introduction: it fulfils the important function of providing a scientific basis for his concept of personality, and is even made to justify his conclusion that the world consists of unitary, purposeful, self-active beings who may be designated as "persons." In this conclusion he sees a most important consequence of his personalist epistemology.

Personalists who follow the tradition of Bowne develop an epistemological doctrine which they call "personal idealism." They hold that there is a real object of knowledge and that thought and thing are not to be identified as in Hegelian idealism. This they term the insoluble "dualism of thought

<sup>5</sup> Cf. F. van Steenberghen, *Epistemologie*, pp. 44, 50.

and thing.”<sup>6</sup> Cognition implies this dualism: without it, knowledge in any intelligible sense would be impossible. To know an object implies that the object exists independently of my knowing it. This might be called the common-sense standpoint: my thought of an object differs from the object itself.

While refusing to identify thought and thing as far as the human mind is concerned, Personalists view the world “not only as independent of man but as in a certain sense objective to God Himself.”<sup>7</sup> The real criterion of the dualism of thought and thing is found, not in the disparity between the experienced object and the real object, but in their “otherness.” Though the attribute of “otherness” is attributed to the real object, as opposed to the mind, Personalists inconsistently assert that the material world has no extramental reality. Again, though the external world possesses no extramental reality, epistemological dualism is safeguarded, in their view, by regarding the soul as distinct from God, and the world as a vast “system of stimuli.” This system of stimuli is represented as, in a certain sense, objective to God, as well as to man. However, the precise nature of this “objectivity” would seem to call for clarification. Personalists find it difficult to explain how the world (call it “system of stimuli” or “medium of communication”) can be external and objective to man and yet possess no extramental reality. Nor is it clear in what precise sense the world is external and objective to God. But the world does exist independently of us; we discover it and we apprehend it, but we do not create it. Its exact nature we cannot know, but we recognize its causality as something external to ourselves.<sup>8</sup> Bowne asserts that the sense-world, in so far as it is articulate, is a thought-product.

While Absolute Idealism identifies thought with thing, Personalism believes that objects do not pass away when we cease to think of them, neither do they suffer change with the fluctua-

<sup>6</sup> A. C. Knudson, *The Philosophy of Personalism*, p. 100 ff.; B. P. Bowne, *Theory of Thought and Knowledge*, p. 296 ff.

<sup>7</sup> A. C. Knudson, *op. cit.*, p. 99.

<sup>8</sup> Knudson, *op. cit.*, pp. 103-110. Bowne, *Personalism*, p. 68.

tions of our thought. The dualism of thought and thing is inevitable. The world exists independently of us, but we can never know its essential nature. Personalists deem that it may even be a divine thought or system of thoughts. The world, without rational principles, is an inarticulate, fleeting flux. This discontinuous impression is interpreted into an abiding self, with the aid of *a priori* principles of mind. Bowne regards as an illusion the belief that there is an "absolute system of reality," with which our thought must correspond in order to be true. Reality is nothing more than the contents of consciousness. We can, therefore, reject the extramental universe of unreflecting thought, for it is impossible to define the world apart from intelligence. We remain in the world of personal experience, convinced that this world can never be explained on the impersonal level. The world of experience can be explained only through a rational, spiritual principle which reproduces it for our thought.<sup>9</sup>

This position of Personalists is akin to that of Santayana and the so-called "critical realists." Our belief in the existence of other minds and so of society is a reasonable hypothesis for the explanation of our experience, but can never be empirically verified. Experience gives us certainty but not knowledge. Experimental verification, without the interpretative activity of reason, condemns us to solipsism. The supposed object-reference of experience, which to the naïve-minded establishes a *prima facie* case for realism, is really nothing more than a "knowledge-claim." Experience becomes knowledge only when it is rationally organized, and refers beyond the fleeting experience to something else.

### III

We should note here that Personalists have not discussed certain questions which concern the very foundations of epistemology. We must now formulate them in order to give our evaluation a more fundamental character. What is "knowl-

<sup>9</sup> Bowne, *op. cit.*, pp. 107-112, 160.



edge" in general? What does the term imply in the philosophy of Personalism? Have I "knowledge"? Does my knowledge attain to "truth"?

The issues raised by Personalism do not entail a discussion of the critical problem nor an evaluation of the various attempted solutions. But it should be pointed out here that, on the Thomist side, a noteworthy contribution to critical epistemology has been made by L. Noël.<sup>10</sup> His so-called "immanent" method is calculated to throw much light on the critical problem and may serve as a critical scientific supplement to the theory of the Personal Idealists. The appeal of such a method to the Personalist should be obvious: starting from an immediate fact of consciousness, it proceeds technically by way of critical reflection and of universal methodic doubt to establish the fundamental conditions of knowledge and of scientific construction.<sup>11</sup> St. Thomas was no stranger to such a method. "*(Veritas) cognoscitur ab intellectu secundum quod intellectus reflectitur supra actum suum, non solum secundum quod cognoscit actum suum, sed secundum quod cognoscit proportionem ejus ad rem.*"<sup>12</sup> Logically, this is the primary fact: "I know something" and "I know that I know it." This is akin to Descartes' "Cogito" but there are important differences in the implications and interpretations of the respective starting-points. Setting off from these immediate data of consciousness, present to the knowing subject, philosophical reflection may rebuild the edifice of human knowledge from what is most easily known. In this way, we may attain to a true critical and metaphysical realism, and at the same time show that to start from thought is not necessarily to eliminate things, and hence that the ego-centric predicament of modern idealism is in no way inevitable.

St. Thomas, in various contexts, takes a more general view of the fact of knowledge as a certain aspect of living beings.

<sup>10</sup> For Noël's doctrine, cf. his *Le Realisme Immediat*.

<sup>11</sup> Cf. L. Noël, *Le Realisme Immediat*, passim. F. van Steenberghen, *Epistemologie*, pp. 1-8.

<sup>12</sup> St. Thomas, *De Veritate*, q. 1, a. 9.

In this sense, it is true to say that the existence of one being for another, which begins on the animal level and is perfected with man, is precisely what we mean by knowledge.<sup>13</sup> Natural objects exist but in no way adapt themselves to the external world. They are endowed with a principle of life by virtue of which they move and grow. The external world does no more than permit or prevent their movements of growth or expansion. But when we ascend from the mineral world and the domain of vegetative life, we see that knowledge first appears with the animal kingdom. The movements of animals are not wholly explicable by their own internal principle of life. They reach out to influence and be influenced by their environment. The actions of an animal in search of prey are evidence of this. Something outside the animal exists for the animal and many complicated actions are performed to bring it within his grasp. One living being becomes aware of another being. The being which knows is, in the first place, its own essence. But in so far as it knows, it becomes something more. It becomes in a manner the object known. Knowledge then essentially means that into the knowing being there enters another being previously existing for itself. As St. Thomas puts it: "*Cognoscentia a non-cognoscentibus in hoc distinguuntur, quia non-cognoscentia nihil habent, nisi formam suam tantum, sed cognoscens natum est habere formam etiam rei alterius; nam species cognita est in cognoscente.*"<sup>14</sup> The difference between that which is never anything but its own essence and that which is, on the contrary, capable of becoming other things, is precisely the difference between the material and the spiritual. "The limitation of the form is due to matter," says St. Thomas. And while the material element in a being restricts or limits it, the spiritual element, on the contrary, enlarges and amplifies it. Hence the gradation of being depends on the varying proportions of spirit and matter. Man is, in a certain manner, capable of becoming all things by his senses and intelligence. "*Anima est quodammodo omnia.*"

<sup>13</sup> Cf. E. Gilson, *Philosophy of St. Thomas Aquinas*, p. 262 ff.

<sup>14</sup> *Summa Theol.*, I, q. 14, a. 1, ad Resp.



Having placed the problem of human knowledge in its broadest perspective, we may now consider the personalist solution. The same fact of knowledge presents itself to us under two different aspects, according as we envisage it from the point of view of the contribution of the object known, or from the aspect of the knowing subject. Personalists consider chiefly the objective point of view. We shall see that their view is idealistic, for the world is not really independent of mind but is constructed by the creative activity of thought.

The dualism, so frequently asserted but so rarely explained, is designed to place a real distinction between thought and thing, between idea and object. From the personalist exposition, it is difficult to determine what is implied by this dualistic doctrine. The failure of Personalism here is due largely to the fact that a dualism is asserted to exist between two realities—thought and thing, idea and object—which are not precisely defined.

That there is a real object of knowledge must be granted. But in what form is it to be conceived? This problem is not settled by *a priori* theories of the nature of man. Only reflection on our own conscious knowing processes can reveal to us anything concerning the nature of their object. St. Thomas, following Aristotle, holds that being is the first intelligible concept attained by our minds. We can perceive nothing, or conceive nothing, otherwise than as a being; and it is only when we have thus perceived or conceived being that we can determine the nature of the object apprehended. Being, says St. Thomas, is the first intelligible concept and the proper object of the intellect. "*Ens est proprium objectum intellectus et sic est primum intelligibile.*"<sup>15</sup> The intellect knows that its judgment is true by a critical reflection upon its act. The intelligence, by reflection, discovers its true nature, which is to conform itself to things: "*in cujus natura est ut rebus conformatur.*" For St. Thomas, a real world exists and is intelligible: its intelligibility permits it to be apprehended by us in sensations and perceptions.<sup>16</sup>

<sup>15</sup> *Summa Theol.*, I, q. 5, a. 2, ad Resp.

<sup>16</sup> *De Veritate*, q. 1, a. 9.

Personalism has not offered a consistent theory of the nature of the object of knowledge. It affirms the dualism of thought and thing, that the thing is an "other" to thought. Mind and its object are asserted to be two distinct realities: the mind apprehends external reality. Such statements are sufficient to satisfy the most ardent realist. But when this doctrine is further developed, it furnishes difficulties which can scarcely be less than contradictions. Thus, while the world "manifestly exists independently of us," and "the dualism of thought and thing is . . . ineradicable," the world is denied any extramental reality.<sup>17</sup> Again, while reality is not something predetermined by the human mind—while, rather, it is "something revealed to us through sensations and perceptions," something discovered but not constructed, "something other than our thought of it"—yet it is asserted that the dualism of thought and thing is not a "fundamental metaphysical one."<sup>18</sup> In short, the dualism turns out to be a quite unintelligible compromise between monism and pluralism, a shadowy distinction hovering somewhere in the misty region between "otherness" and metaphysical dualism. In such a doctrine, it is difficult to understand the status of the object in relation to mind.

If we would trace the source of these contradictions, we should note first the nominalistic trend of the whole personalist epistemology. The abstract and universal have no existence apart from the individual and the concrete. Bowne regards our thinking as mainly symbolic and our class-terms as mere logical symbols. Allied with this Nominalism is the attempt to combine an idealistic view of the world with a dualism of mind and object. In the opinion of personal idealists, matter, as an object of sense-experience and of scientific investigation, is not ontologically real. True, metaphysical reality is not composed of substances, whether material or spiritual, active or passive, which somehow persist through time. On the con-

<sup>17</sup> Knudson, *op. cit.*, pp. 103-104.

<sup>18</sup> *Ibid.*, pp. 106, 113. Bowne, *Theory of Thought and Knowledge*, pp. 244-5.

trary, all reality is personal and is constituted by the unifying activity of consciousness. There is no such thing as a real world, possessing extramental existence. For Personalists, the physical world has a purely phenomenal character and an existence which is secondary and instrumental. Hence the inconsistent solution of the critical problem. On the one hand, it emphatically asserts a dualism of thought and thing, seeing clearly that only on this basis is it possible to offer a consistent theory of knowledge. On the other hand, this dualism must permit an idealistic view of the world. The objective world must not be given an existence entirely independent of mind, in such a fashion that it should exist whether minds apprehended it or not. The external world must be one that "exists only as it is conceived."<sup>19</sup> As a consequence of this double allegiance, the dualism becomes unintelligible. Beyond the repeated assertions that it exists, that it is "inescapable," "ineradicable," but not "metaphysical," no illuminating account is offered which would define its precise nature. The mere dogmatic assertion of the existence of a dualism of thought and thing is logically insufficient to found it as a philosophical doctrine. The confusion of the personalist position should make it clear that the only consistent solution of the problem of knowledge lies in realism, asserting a *metaphysical dualism*, in which mind and its object are two ontologically distinct realities. This doctrine Personalists are obliged to reject by the exigencies of their system, which contains the fundamental principle of the creative activity of thought.

#### IV

Personalists reject the realistic starting point of St. Thomas, according to which the mind apprehends an objectively existing order. To do full justice to the claims of human reason, they deem it necessary to assign to it a very full and independent rôle. Reason must be active, a constitutive factor in the world. Hence the cardinal principle of personal idealism—

<sup>19</sup> B. P. Bowne, *Metaphysics*, p. 5.



that thought-processes are primarily creative. Reality is, in a sense, revealed to us through our sensations and perceptions; they are the "media" through which it is "given" to us. Thus we are brought into contact with it, we become aware of it, through external stimuli. There is in our knowledge an element which is "given," which we do not create, but which comes to us from without. The raw material of thought in the sensibility is due to external stimuli. But apart from this initial impulse, thought is creative rather than receptive. The structure of our knowledge is due to mind—the mind constructing nature. The extreme position is taken by Carr that both the structure of our knowledge and its contents are determined by the mind.<sup>20</sup>

To naïve thought the world exists as it is perceived. No distinction is made between primary and secondary qualities. The object seems to determine completely the knowing process. With the appearance of error, however, doubt arises: the doubting mind begins to distinguish the "apparent" from the "real." Next arises the question of the true nature of things, and this leads to metaphysical speculation. As a result, we are confronted with a double standard—that of the senses and that of reason—and thus we face the problem of their relative value.

Personalists reject the ancient and medieval systems of epistemology because of their "crudely realistic foundations." Such systems, it is alleged, made the object the determining factor in knowledge, while the subject became the passive recipient of this determination. The mind was represented as a *tabula rasa*, and the figure of the seal and wax was employed to illustrate the perceptive process. The medieval epistemologists, in general, subordinated the knowing process to the object in such a way that the reality of the object was supposed to be given in thought itself.<sup>21</sup> In opposition to such a view, Personalists uphold the creative activity of thought. Regarding Kant as the first philosopher to conceive thought

<sup>20</sup> H. W. Carr, "Imagination and Reason," *The Personalist*, XII (1931), p. 90.

<sup>21</sup> Knudson, *op. cit.*, p. 119.

as creative, they rely chiefly on the *Critique of Pure Reason* to furnish a basis for their epistemology. Pre-Kantian philosophy, in their view, over-emphasized the receptive function of the human mind, because knowledge was regarded as something wholly "given" to us. In sense-experience, we received impressions from without and in reasoning we either brought to light what was implicit in the sensory data, or brought to consciousness what was innate in the human mind. There was a diversity of views as to the nature of the external stimulus; but it was generally held that sense-perception implied a realistic view of the world. Sense-experience was produced in us by some power external to ourselves rather than by the mind itself.

The doctrine of creative thought-activity is designed to place the senses in thorough subordination to reason. The most effective means of achieving this is the denial of all ultimacy, all self-sufficiency, to sensations and perceptions. They are represented as thought-products, having no definite content until they are articulated in thought. This was precisely the contribution of Kant. In the *Critique of Pure Reason*, the sensibility, as the passive recipient of external stimuli, can yield nothing but fleeting impressions, lacking coherence and all intelligible content. Sensations, of themselves, without the impress of thought, lack unity and identity. They constitute merely the raw material of thought, its abstract presupposition. As soon as they become definite enough to be called sensations of anything, they already have the character of thought impressed upon them. Sensations, perceptions and memory images are products of thought activity. The passive sensibility has no power to produce sensations or perceptions of a definite character. What it contributes is inarticulate. By this doctrine, Kant hoped to establish firmly the supremacy of reason against the claims of sense. His rationalism took away from sense the last shred of cognitive independence, and reduced it to complete inactivity. Whatever cognitive value it seems to have is due to *a priori* principles of thought.

Pre-Kantian philosophy is arraigned by Personalists on the charge of conceiving reason as a purely passive and receptive faculty, and of allowing too great a share of independence to sensations and perceptions. As might be expected, the major portion of the criticism is reserved for Aristotle. His theory of knowledge conceived reason as firmly anchored in sense, and failed to make any sharp distinction between senses and reason. The function of reason was to read off, or interpret, the universal concepts which are implicit in sense-experience. Indeed, it is asserted that his doctrine is "saved" from empiricism and sensism only by a declaration that the intelligence, as a faculty, is as original as the sensibility. And the failure of modern Thomists to deal sympathetically with Kant's philosophy is attributed to their adherence to the "sense bound" epistemology of their master, Aristotle!<sup>22</sup> For Personalists, Kant's greatest contribution to philosophy was his rejection of the passivity of mind and his emphasis on the creative activity of thought. He showed that *a priori*, structural principles of thought, the categories, give form and meaning to our experience. They introduce order into the fleeting impressions of the sensibility. Aristotelians always ascribed a dangerous independence to sensations, perceptions and memory-images. These preceded thought and had a certain independence of it.

In all these strictures on Aristotle, there is room for a better understanding of his doctrine of the universals and of the abstractive activity of the intellect. We must bear in mind that it is ever on the question of the metaphysical status of the universals that he is at pains to stress his departure from Plato's doctrines. While this is so, it is, perhaps, possible to admit some truth in the assertion that he never completely succeeded in freeing himself from the ultra-realism of his master, though he was quite conscious of all the difficulties inherent in the latter's doctrine.<sup>23</sup> Perhaps, too, he did not completely harmonize the Platonic unity and eternity of essences

<sup>22</sup> For such criticisms, cf. Knudson, *op. cit.*, pp. 127 ff.

<sup>23</sup> Cf. Régis Jolivet, *La Notion de la Substance*, pp. 36, 304.



with their existence in many individuals. Nor does he consistently distinguish metaphysical essences from physical substantial forms, using the term "form" (*εἶδος, μορφή*), to designate now the one, now the other. But in his view, all existence is concrete and individual; the individual only has existence in the real order. The universal, as a universal, exists only in the apprehending mind. The universals are not, as Plato asserted, self-subsistent, substantial entities. In particular, being and unity, the widest of the universals, are not substances. The polemic which he directs against hypostatization of universals (as in the Platonic forms) is one of the leading notes of the *Metaphysics*.

The world in which we live is, for Aristotle, a world of concrete individual things, acting and reacting on one another. In contemplating these individuals we become aware of certain characteristics common to many of them. These characters are, for Aristotle, as real and objective as the individuals themselves. They are not, in any sense, mental constructions. In his criticisms of the Platonic Forms, he warns us that we must credit them only with that existence proper to universals, viz., they exist only as attributes of individuals. We must not fall into the Platonic error of positing a separate world of universals. The mere operation of ideas cannot explain our world, which is one of change and becoming. And in this connection, too, we should recall the celebrated Aristotelian distinction between first substance and second substance—a distinction which is strangely ignored by Personalists. First substance is individual: this man, this house. It neither exists in a subject nor is affirmed of one. Second substance is universal and is called substance only by analogy. It is affirmed of a subject, as a predicate, but nevertheless does not inhere in a subject.<sup>24</sup> The universals are affirmed only of first substances: "Peter is a man." The universal, "man," expresses the nature of Peter but does not inhere in him as a subject.

The Aristotelian doctrine of moderate realism was adopted

<sup>24</sup> *Cat.* 5 (2a 11); *ibid.* (2b 15); *ibid.* (3a 7).

by the mediaeval Scholastics. In his *Commentaries on the Metaphysics of Aristotle*, St. Thomas writes: "*Nihil est in rerum natura existens, sed tantum in consideratione intellectus abstrahentis communia a propriis.*"<sup>25</sup> Again: "*Sed universale est commune multis, hoc enim dicitur universale quod natum est multis inesse, et de multis praedicari.*"<sup>26</sup>

## V

It should be quite clear at this stage that Personalism is committed to an idealistic view of the world. If the structure of knowledge is built up from within mind itself, then the existence of an extramental world is a mere assumption. Many of the qualities commonly attributed to such a world (e. g., color, sweetness, bitterness) have no extramental existence. Since these secondary qualities have no counterpart in reality, the perceptual world cannot be a replica of the external world. We can never perceive any world other than the one we construct. The world I perceive, Bowne tells us, is the world I construct—this is true of all perception. But though they regard the external world as phenomenal, Personalists are agreed in asserting the reality of the self. Here personal idealism parts company with Kantian phenomenalism. For Kant rejected a knowledge of the noumenal self and taught a doctrine of a shadowy Ego. He rejected as mythical the existence of noumena, or things-in-themselves (*Dinge-an-Sich*). But since phenomena are effects, it is very natural to seek their causes. Kant rightly held that the categories are valid only in their application to the objects of a real or possible experience; but he erroneously restricted experience to sense-experience and to physical sensations. For the Personalist, it embraces also the domain of self-experience, or self-consciousness. The categories acquire their full meaning only in their application to an Ego. The category of causality, for instance, can imply nothing more than the self-conscious efficiency of a

<sup>25</sup> *Lib.* XI, lect. 2, 2174.

<sup>26</sup> *Lib.* VII, lect. XII, 1572.

free intelligence.<sup>27</sup> If the self is real it must be active: reality and inactivity are incompatible. A self wholly passive would have no substantial reality; its reality is manifested in and through its activity. Thinking is of the essence of the soul, and only in so far as thought is creative does it form a constitutive part of the world. Personalists find the ultimate theoretical basis for the reality of the self in the creative character of its thought-activity. Thought, which is essentially a creative process, requires as a fundamental condition the existence of a self which endures, and which remains identical throughout the successive changes of mental life.<sup>28</sup>

For the Personalist, the world does not exist as it is perceived. This was the "old" theory which borrowed all its force from the supposed immediacy of perception. The perceived world contains something more than the real world. The latter (which, for Personalists, is a system of stimuli) is in some way incomplete without mind. Indeed, if we follow to their logical conclusion the arguments of the personal idealists, we should be obliged to hold that the world has no existence apart from knowledge. Its existence, if it possesses any, is purely embryonic, or instrumental: it exists in order to be known. Our minds fashion nature: the world is a thought-product.

We have here touched upon a fundamental vice in the personalist epistemology. It is pervaded by a tendency to set up constitutive principles of thought anterior to all experience. This tendency is a legacy from Kant, and, as in the *Critique of Pure Reason*, it leads to an idealistic view of the world. Kant changed the emphasis on the receptive character of human thought and made mind a creative and determining factor in the manufacture of experience. Personalists adopt his doctrine to "save" human reason from sensism. In their view, if reason is to be safeguarded, it must be assigned a very full and independent rôle. It must be conceived as active, a constitutive factor in the world. This preoccupation with the

<sup>27</sup> Bowne, *Personalism*, pp. 103-104.

<sup>28</sup> Knudson, *op. cit.*, pp. 136-138.



vindication of reason is largely due to a failure to understand the traditional Scholastic doctrine of moderate realism. In this doctrine, reason is certainly not subordinated to sense, and hence there is no danger that by accepting it we are capitulating to sensism. In the Thomist epistemology, our ideas are derived from the senses and thus from things, but by the operation of a spiritual faculty; and so are different from sensations and images. But though essentially different from sensations and images, our ideas are abstracted from them by the operation of a spiritual faculty. The mind is active but its activity is not creative. It does not impose its own subjective forms upon the data of experience. The essential activity of the human mind is an abstractive one, drawing from the data of experience the essential qualities or knowable elements of things and utilizing them in the formation of a universal concept. Sensists likewise hold that our ideas are derived from the senses, but, in their view, the senses are, of themselves, sufficient to produce them; ideas do not differ essentially from sensations and images.

Personalists accept the Kantian doctrine of the sensibility and of the categories of the understanding. In their reconstruction of the *Critique of Pure Reason*, they are led to present an idealistic view of the world, but at the same time cannot steer clear of many of the contradictions inherent in the Kantian system. The most serious of these contradictions has been noted already in discussing the alleged dualism of thought and thing. It has to do with the existence of things-in-themselves and their relation to the knowing faculties.

The crucial question for epistemology, and one which stands at the parting of the ways of idealism and realism, is: Does the human mind apprehend an objectively existing order? Or is this order fashioned by mind itself? To this all-important question, Personalism has no consistent answer to offer. In defending a dualism of thought and thing, it would seem to imply a belief in the existence of things-in-themselves as an "other" to thought. But this dualism is subjected to quali-

fications that are incompatible with a realistic view of the world. The source of this difficulty is to be traced to an allegiance to Kant's critical philosophy. The *Critique of Pure Reason* rejects the possibility of a knowledge of things as they are in themselves.<sup>29</sup> The intuitions with which all knowledge begins contain nothing real, nothing as it is in itself, nothing beyond phenomena, or the modes in which things affect us. "All our knowledge," says Kant, "begins with sense, proceeds thence to understanding and ends with reason, beyond which nothing higher can be discovered in the human mind for elaborating the matter of intuition and subjecting it to the highest unity of thought."<sup>30</sup> The sensibility receives impressions from transcendent, unknown objects. These intuitions are first determined by the *a priori* forms of space and time, and are then further formed by the categories of the understanding into scientifically conceived things. Thus arise the synthetic *a priori* judgments which are valid, for the universal element in each is a determinable law of the mind, the application of which can be known *a priori*. The necessary and predictable character of experience is due to the subject. But the objects determined by the categories are not noumena but phenomena, that is, the real intuited spatially and temporally. Phenomena, to which alone our knowledge extends, are but the appearances of things, the modes in which they affect us. That which lies beyond phenomena is the noumenon, the *Ding-an-sich*. For Kant, every real object is a physical object, and as real object can be apprehended only by an intuition.

Must we then abandon all effort to know noumena, to attain the *Ding-an-sich*? The theoretical reason, indeed, fails to give us any knowledge of things as they exist in themselves. It can tell us nothing of the deepest truths of reality: God, freedom of the will, the immortality of the soul. These truths it can never apprehend, for they can never become phenomenal. But lest "our unavoidable ignorance with regard to things in

<sup>29</sup> Cf. *Critique of Pure Reason*, Transcendental Doctrine of Elements, I, Transcendental Aesthetic.

<sup>30</sup> *Ibid.*, Transcendental Dialectic, II, A.

themselves" should prove too irksome, lest the necessary limitation of our theoretical cognition should unduly gall us, Kant hastens to reassure us that the practical reason supplies the deficiency. The practical reason, for Kant, is not the reason strictly so-called, but the will, which prescribes and decrees. The *Ding-an-sich* is, therefore, not known but believed. We need not relinquish such truths as the freedom of the will, or the existence of God, because they lie beyond the ken of the speculative reason. Such truths are possible, and since they are the basis of our moral life, reason confidently believes them. The assent to such truths is granted, not because of theoretical evidence but because of the practical claims of the moral life. "I must, therefore," said Kant, "abolish knowledge to make room for belief."<sup>31</sup> The "ambitious attempts to demonstrate the immortality of the soul from the simplicity of the soul's substance, or to deduce the existence of God from the conception of an "ens realissimum," must now be abandoned. The practical reason demands that man lead a morally good life, and such a life is impossible unless certain metaphysical truths be admitted. The practical reason, therefore, postulates these truths. They are accepted, not because of a theoretical conviction founded on objective evidence, but because of a certain invincible moral persuasion, a "faith."<sup>32</sup> The resulting position is that "no one will be able to boast that he knows that there is a God and a future life. . . . My conviction (*scil.* of these truths) is not logical but moral certainty; and since it rests on subjective grounds (of the moral sentiment) I must not even say: It is morally certain that there is a God, etc., but: I am morally certain; that is, my belief in God and in another world is so interwoven with my moral nature that I am under as little apprehension of having the former torn from me as I am of losing the latter."<sup>33</sup> The necessity of obeying the moral law forces me, according to my interests, to believe in the existence of God, of immortality, etc., as this is the sole

<sup>31</sup> *Critique of Pure Reason*, Preface.

<sup>32</sup> *Critique of Practical Reason*, Part I, Book 2, 2, vii.

<sup>33</sup> *Critique of Pure Reason*, Canon of Pure Reason, III.



condition on which my moral end could agree with all other moral ends and so have practical validity. Hence Kant ends by elevating faith above reason and grants primacy in matters suprasensible and metaphysical to faith, in which assent is a necessary supposition of reason, ultimately due to will.

Hence the categories do not extend our knowledge beyond phenomena: they do not lead us to a noumenal knowledge of what is given in sensation. Of themselves they are empty; in order to be valid they must be filled by experience, and all the content that experience can put into them is phenomenal. "The understanding *a priori*," says Kant, "can never do more than anticipate the form of a possible experience; and, as nothing can be the object of experience except the phenomenon, it follows that the understanding can never go beyond the limits of the sensibility. As phenomena are but representations, the understanding refers them to a something as the object of our sensuous intuition. This means a something equal to X, of which we do not, nay, with the present constitution of our understanding, can not know anything."<sup>34</sup>

This something is the noumenon, the transcendental object, the *Ding-an-sich* or thing-in-itself. In the Kantian system, the status of this real object is very difficult to determine. The Personalist position is, perhaps, even more obscure. The nature of the physical world remains a mystery, unsolved by the metaphysicians of the school. Whether it exists in itself (as the Kantian *Ding-an-sich*) is not clear, though this seems unlikely, since all extramental reality is denied. Personalists have, after Kant, radically changed the whole conception of the nature of knowledge. Instead of a vision, or seeing of the object, knowledge is now a fashioning of the object out of the raw materials supplied by the sensibility. It is a product of a blind synthesis of *a priori* categories of the understanding with the sensible intuitions furnished by the sensibility.

Such a theory fails in the test of critical reflection. It contradicts the immediate testimony of consciousness according to

<sup>34</sup> *Critique of Pure Reason*, Transcendental Doctrine of the Faculty of Judgment, Chap. III.

which we apprehend objects which are external to us but which we do not construct in the Kantian sense. If there is to be knowledge in any intelligible sense, it must be of something for which the subject's act of knowing cannot in any way be held responsible—something not created by the mind's action, and, in so far as not created, revealed to it. In our perception of the external world, there is indeed a degree of "fashioning" or "construction" which it would be arbitrary to deny. Our cognition of an object here and now perceived is completed, developed and given fuller detail by means of objective elements formerly perceived. But this elaboration of our cognition is very different from the creative activity of thought upheld by personal idealists and by Kant. The latter makes the object of knowledge of construction resulting from the imposition of *a priori* forms of the understanding on the data of the sensibility. It is assumed by Personalists that Kant has forever settled the question of the nature of knowledge; whereas, in reality, his solution of the critical problem is full of artificialities and contradictions. An adequate basis for a concrete Personalism is not to be found in Kant's transcendental idealism.

## VI

For the Thomist, the person is revealed in its acts and it is only by a study of the intellectual activity of man that we can hope to arrive at a knowledge of his nature. Now, every act of intellectual knowledge is at once a revelation and an active possession of the ego. To know is to affirm that things are, that the real exists; it is also to possess, in an immanent fashion, the object known. All intellectual knowledge, then, whether the object be the ego or the non-ego, is fundamentally an *Ich denke*, a consciousness. If we consider knowledge of consciousness of the self, this proposition is self-evident; for in self-consciousness the person possesses itself in spiritual fashion, and is actively present to itself. This further implies that the ego, to a certain extent, constructs itself by its activity. The human personality is not given, *in actu primo*, as a form which is com-

plete and perfect, with its character of selfhood completely achieved. It is by its own activity, and chiefly by intellectual activity, that the person perfects and develops itself. We can say then, with truth, that, in a certain sense, knowledge is constitutive of the human ego. Without cognitive activity, the human individual could, indeed, be considered as an ego; but it would be difficult to conceive the peculiar selfhood of a person constituted by the mere fact of individual existence. What is true of knowledge considered as consciousness of the self is equally true of knowledge of the non-ego. The active assimilation of the forms of other beings by the ego is a perpetual affirmation of ourselves in the representation of another. This fact differs radically from the conclusion of Stern that our epistemological nature compels us to think of the world in the form of personality. This is a view which borrows all its force from the Kantian doctrine of the nature of the human mind and which, apart from this doctrine, is quite invalid. Reflection on our cognitive activity shows that an intellectual act reveals to us immediately only the existence of the self which knows.

Thought, then, reveals the existence of an ego which perfects itself and possesses itself with a certain autonomy. This autonomous possession of the self, which for idealists is absolute, is, nevertheless, tempered by a certain dependence. Thought does not construct its judgments as it pleases; it is subordinated to truth, which dominates it. The mind conforms itself to the real order which is apprehended. It is so constituted that it must affirm what objective evidence reveals as true. And what the intellect affirms as true for itself, it feels constrained to affirm as true for all thought in every circumstance. In this way, and not from the Kantian "categories," arise our universally valid judgments. Truth, which is given as something objective, is the object of a disinterested attitude on the part of mind.

In the second place, our intellectual knowledge carries an abstract and universal import, a source of both perfection and

imperfection. Abstract concepts have the unique property of being applicable to an indefinite number of individuals. In seizing their essence, immutable and meta-empirical, the intellect comprehends in a simple unity a multiplicity of things. But this comprehension does not extend to the individual aspects of things nor to their concrete character, and so it is schematic and imperfect, in consequence of the limitation of human intellect.<sup>85</sup> Under one aspect, then, our thought appears as an unlimited desire of knowledge. From another aspect, it appears as an imperfect act. As a thinking being, man is interested in everything, in the external world as well as in his own interior world; in beings material and spiritual, in facts and the relations of facts; in passing phenomena and in the unchanging essences of things. To define the objective amplitude of the object of knowledge, one cannot do better than say with St. Thomas that it is commensurate with being itself, with truth. But while intellect is thus an unlimited desire for truth, it is, at the same time, essentially limited in act. The intellect restricts itself to a particular aspect of the universe—a limitation imposed by the present condition of the union of soul and body. But it must never be conceived as shut up in the shell of solipsism. Its essential nature is to apprehend an objectively existing order: “*in cuius natura est ut rebus conformetur.*”

## VII

Thomism, in keeping with the Aristotelian tradition, sets out from the data of common experience. By reflection on man's intellectual activity, it abstracts the concept of being-by-participation, which ultimately enables the intellect to affirm with certitude the existence of a Being subsistent in Itself. With the aid of many metaphysical principles, it constructs a hierarchy of all reality. Confirming the evidence of everyday experience, it teaches that the universe is a diversified and harmonious whole. The universe is made up of many different

<sup>85</sup> St. Thomas, *Summa Theol.*, I, q. 55, a. 3, corp.



substances, distinct from one another. This "pluralism" of St. Thomas stands in uncompromising opposition to all forms of monism.

At the very beginning of its philosophy, Personalism departs from Thomistic thought. St. Thomas begins his system by affirming that there is a coincidence between the laws of knowing and of being, and proceeds to construct a realistic synthesis. Personalism, on the contrary, builds its system on Kant's transcendental idealism, and never arrives at a consistent solution of the nature of reality. Thomism envisages a universe of things, which have being in various degrees. At the head of the hierarchy, it demonstrates the existence of a God who is being, but who is distinct from the universe and everything in it. The latter are creatures and are beings only by participation. Personalism is born of the idealist tradition and partakes of all its defects. With its doctrine of Nominalism, it distorts the essentially abstractive character of human knowledge, and by upholding the primacy of practical reason, it bases all our knowledge ultimately on a faith which can receive no validation from without. Faith is its own justification. Intellect is completely subordinated to will and is rendered incapable of attaining logical certitude. "The mind," says Bowne, "is not driven by any compulsion of objective facts, but rather by the subjective necessity of self-realization and self-preservation."<sup>10</sup>

For Thomists, on the other hand, human personality has two levels on which it can transcend the limits of its own nature. On the cognitive level, it can become, in a manner, all things, by enriching itself with their forms. On the appetitive level, man is capable of embracing every object that the intellect exhibits to him as good or desirable. The position that "life is richer and deeper than logic" is entirely in harmony with the Thomistic view of human nature. Man is not only, or chiefly, an abstract speculator. He is a living totality with practical needs and interests to which he must adjust himself in order to live a full, human life. His practical necessities and theo-

<sup>10</sup> B. P. Bowne, *Theism*, p. 27.

retical interests intermingle. The practical demands of social relations, the claims of a community life, as well as the exigencies of the material part of his being, constitute a large part of man's life.

Human knowledge is not, then, a bare activity of intellect. It involves the whole man and requires the co-operation of man's environment. It is an aspect of a general situation, of which the state of mind is only an element, though a very significant one. We may not overlook the physical elements in knowledge. In Personalism there is a lack of an orderly account of the knowing faculties, based on psychological investigation. There is an absence of a systematic exposition of the different grades of knowledge, of the distinction between rational and sense knowledge. Personalists do not attempt a proper criticism of sensation, a task which is essential to epistemology. Yet only on such bases can we build a truly scientific treatment of knowledge. The Thomist knows very well that the knowledge-process is very complex. Into the "knowledge-situation" there enter objects known by their bodily activities, the bodily organism with its nervous system and senses, and the intellect. There is no such position as that of a bare, isolated intellect, directly confronting its object. The object of knowledge relates itself to the complete human self.

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## THE FIRST PRINCIPLES OF CHANGEABLE BEING

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**B**Y changeable being in general we here understand everything which is capable of successive motion or change such as that which we perceive by our senses. Various names are employed to designate this object. It is called sensible reality, or that which is perceptible by sense. It is called the sensible universe, or the whole consisting of things perceptible by sense. We speak of it as the material and the physical universe or nature, that is, the whole which consists of things capable of successive motion or change. We call it the corporeal universe, or the whole consisting of extended parts. We call it the sensible world, or the venerable whole perceptible by sense. We name it the cosmos, that is, the whole which consists of many different parts disposed in an orderly way and constituting a beautiful system.

Through our sensory experience we are aware that there is something which appears changing and various. Sensible objects appear and disappear independently of our will. That which appears to us has the aspect or reason of being: it is something not only sensible but also intelligible. We apprehend the disappearance of an object from our experience as something opposed to being, and called non-being. We judge that being is not non-being, and thus we divide non-being from being. We understand that a being such as the self is undivided or one, and that one being is divided or distinct from anything else which we experience, as the self is distinct from our sensory activities. We experience many sensible objects, especially the objects of touch, as things opposed to our knowledge of them. We sense them acting sensibly upon us. Some of these objects are pleasant and we enjoy experiencing them. Others are painful and excite our grief. We cannot sense simply at will. Fre-

quently we can touch that which we choose to touch or escape that which we dislike by reaching for it or withdrawing or otherwise moving ourselves. The sensible world appears and acts sensibly as being distinct from our knowledge of it. In particular we are aware of the self, and we know that the self is not only something sensible but also something permanent and distinct from our knowledge of self. Through sensory experience and through our knowledge of being and non-being we know that the objects of our knowledge are somehow distinct from our knowledge itself. Non-being can exist only in our knowledge, and as an object known, whereas the cosmos manifestly is in itself or has being of its own.

We can initiate certain changes in the sensible world, and we understand some of the reasons for the things which we make, such as clothing and houses. When producing works of art we proceed from definite principles to certain ends. In this respect human art seems to imitate nature working through determined means to certain ends, as birds make nests for their young, and their young grow feathers for protection and for flying. Hence it seems that the cosmos is a work of intelligence and can be understood by us.

The pageant of the changing world in which we actively participate excites our admiration and curiosity. Sometimes we observe it with wonder, and ask the solemn question: What is it? What is this reality which undergoes sensible change? What manner of being is this, whose parts come sensibly into being and sensibly cease to be? What is its very essence? From what is it made? This question gives birth to philosophy, because the cosmos is the first reality which challenges the power of human reason to achieve a clear understanding of all that is.

We are convinced that we understand a thing which has principles, causes or elements when we know what its principles, causes or elements are. Our scientific knowledge of a subject is derived from certain first principles which are the necessary sources of the being of the subject, or of its becoming, and of its being understood by us. The first principles of



changeable being in general, and the principles of our scientific knowledge of changeable being, can be manifested by reasoning from the data of sensory experience and from certain general truths, such as the principles of non-contradiction and sufficient reason, and particularly from the principle which we state by saying that as a changeable being appears and acts sensibly, so it is. The first principles of a changeable being can be manifested conveniently after we have attained a general understanding of the numerical and specific degrees or distinctions which are to be found in the sensible world. Hence we shall consider in the first place the degrees or distinctions of changeable being in general, and then the first principles of a changeable being.

## I

### THE DEGREES OF CHANGEABLE BEING IN GENERAL

Concerning the degrees or distinctions of changeable being in general, there are two questions to be decided: 1. Whether changeable being is one or many numerically? 2. Whether changeable being is one or many generically and specifically?

#### 1. WHETHER CHANGEABLE BEING IS NUMERICALLY ONE OR MANY?

##### Difficulties

It may seem that changeable being is numerically one, for the following reasons.

(1) Changeable being is known by us through our sensory experiences. By sensory experience, particularly by touch and vision, we apprehend something which appears to be extended without interruption. Therefore changeable being is one continuous whole.

(2) Changeable being is the cosmos. The cosmos seems to be a great organism composed of many parts having different properties and activities by which the whole moves itself to its own perfection. Therefore changeable being is numerically one.

(3) Changeable being is the sensible universe or reality. But reality, or all that is, is one. Therefore changeable being is numerically one.

### Solution

It is evident that there are in the world many colors, sounds, odors, tastes and tactile qualities, many changes in these qualities, and many movements perceptible by sense. Beings such as these sensory phenomena are called accidents. Through our knowledge of various changes which occur in us, we know that the self is distinct from the activities and other accidents by which the self is modified. Our walking does not leave us and go on without us, but requires the self as the subject in which it exists and to which it gives a secondary mode of being, that of locomotion. This is true also of our seeing and thinking, and of our color, warmth and figure. Our accidents inhere more or less permanently in ourselves. They do not exist simply, or have their being simply in themselves. But we are aware, especially through our free activities, that the self exists simply, and does not inhere in any subject. A being which is primary inasmuch as it exists simply in itself, not inhering in another, and which is the subject in which accidents inhere, is called a substance.

When we inquire whether changeable being is one or many numerically, we are asking whether the whole world is one sensible substance, or consists of many substances which are absolutely distinct from each other.

We know through our sensory consciousness that the self pertains to the sensible world. We can move and touch our head, arms and legs, and we are sure that these are parts of the self. Through our intellectual consciousness we are aware of our individual being, that is, of the unity of our substance distinct from our activities and other accidents. We know that we are composed of many sensory parts which are parts of one and the same substance. By our sensory and intellectual consciousness we know that the self is at least a part of the world, that we apprehend the world from within it, and that we have

need to employ sensory experience and reasoning in order to understand the world. The self is either the whole substance of the world, or one substance among many.

From ordinary experience it is clear that the self is not the whole substance of the world. We have sensory experience of many objects which we apprehend as distinct beings who are similar to the self and able to manifest their own thoughts and desires by means of sensible signs. The distinction between the self and another seems most evident when we are aware that our thoughts and desires are opposed to the thoughts and desires of the other.

The unity of the self is manifested by the manner in which we operate. Anxiety disturbs our digestion; strenuous exercise impedes our use of reason. One intense operation impedes another within us, and this shows that all our operations proceed from the same source. Our vegetative life is the substrate of our sensory life and nourishes the organs of sense. Our sensory life is the substrate of our rational life, and somehow nourishes the life of reason. All of our parts with their various properties and activities are ordained to one higher activity which is that of our rational life.

We can determine whether a whole of which we have experience is one substance or many by the way in which it appears and acts sensibly. That which appears and acts as a primary unit undivided in itself and distinct from all other things is one substance. If distinct properties appear in distinct parts, if no common property pervades the parts, and if the properties and activities of all the parts are not united and directed to a higher activity, then these parts are distinct substances. The world presents to our sensory experience many parts which appear and act as primary units having distinct properties and activities which are not united and directed to a higher activity. For example, the various beings which we call a dog, a bird and a tree appear and act as primary units. Things such as these are not mere groups of phenomena without any substance, because accidents require substance in which to exist, and because the sensory properties and activities of each are unified

from within. The numerous parts of the world which appear and act as primary units are disposed in an orderly way, and some promote the welfare of others, but the properties and activities of all the parts are not united and directed to a higher activity of the world as a whole. Hence changeable being or the sensible world is not one substance numerically, but consists of a multitude of substances which are absolutely distinct from each other.

### Reply to Difficulties

(1) We achieve a scientific understanding of changeable being by reasoning upon the data of sensory experience with the aid of certain general truths. Material substance is perceptible through its sensible accidents, such as color and figure, but we apprehend a substance more perfectly by reason than by our senses. Our sensory consciousness is not sufficient to manifest all the parts or the exact limits of our own substance. Vision seems to be more refined than touch, yet even with the aid of a microscope we cannot observe the ultimate parts of sensible things so as to see whether their parts are continuous. But from sensory experience and the principle of sufficient reason we know that the sensible world consists of many parts which appear and act as primary units and which are distinct substances. Many distinct bodies or extended substances appear and act separately, and manifest that they have distinct terminations of their parts. Distinct bodies are discrete, not continuous. Hence the world is not one continuous whole.

A house which is made from many stones or bricks and pieces of wood is not one substance. Each polyp in a branch of coral exhibits all the parts and activities of a complete animal, and is an individual substance. A malformation in which the principal parts of the normal type are multiple is not one substance but many. A crystal of sugar has similar parts which cohere, and is an individual substance.

(2) We have sensory and intellective consciousness of the self as an organism. From our knowledge of self and of other



individuals like the self, we know that an organism is one sensible substance composed of different parts which it can employ as organs or instruments to move itself from within, as we move ourselves when we walk, or when we nourish ourselves and grow. The cosmos is not one substance but a whole consisting of many substances which are absolutely distinct from one another. Hence the cosmos is not an organism in the same manner or sense in which the self is an organism. Nor does the cosmos move itself simply, because it is not one being simply, or an individual substance.

A family, tribe or nation is a union of many rational organisms, and does not manifest any operation higher than the rational activities of its members. A society is composed of primary units or individual substances, and is not itself a primary unit but a secondary one. A herd, flock or colony of brutes does not manifest any operation higher than the instinctive activities of its members, and is not one substance but a union of many. Ships, engines and other machines are composed of distinct substances which are united from without in such a way that one can be moved by another. Mechanical devices are secondary units, not primary ones, and they do not move themselves simply.

(3) We apprehend the sensible universe not only by our senses but also by our intellect. Many accidents are perceptible by sense, but relations, such as similarity, equality and kinship, are purely intelligible accidents. Substance as such is a manner of being which is intelligible, not sensible, although we apprehend material substances through their sensible accidents. Substances are beings and units simply, or in the primary sense of the terms; whereas accidents are beings of a being, and are called beings and units in a secondary sense. From experience it is evident that the universe is not one substance or accident. Nevertheless, each being is one numerically, and the cosmos itself appears to have a certain unity of composition and of order, inasmuch as some material substances promote the welfare of others. The sun, for example, by its light and heat is of benefit to organisms.

The consideration of being as such and of unity does not pertain to philosophy of nature, but to metaphysics. In philosophy of nature we consider only that which is proper to changeable being. Being as such and unity are purely intelligible and most universal, and are considered in the most universal science.

## 2. WHETHER CHANGEABLE BEING IS SPECIFICALLY ONE OR MANY?

### Difficulties

It may seem that changeable being is one specifically, and does not consist of groups of substances which differ according to generic and specific degrees of perfection, for the following reasons.

(1) Changeable being consists of many sensible substances. All sensible substances are material ones. Therefore changeable being is one specifically.

(2) Material substances are known by us through precise experience. Such experience seems to manifest only moving particles, or matter and motion. Color seems to be due to the motion of particles or waves which strike our eyes and excite our nerves. Sound seems to be an undulatory motion in the air or some other medium. Heat seems to be a vibratory motion of molecules. The larger bodies are composed of many molecules, and these seem to consist of discrete particles which are disposed in empty space. Therefore all material substances are of one species.

(3) Substances which do not perceptibly differ from each other are of one species. It seems that physical substances are so similar that they could all be arranged in a series in which adjacent substances would not perceptibly differ from each other and in which there would be no gaps. Therefore all physical substances are of one species.

### Solution

We know that the cosmos consists of a multitude of individual substances. Each observable substance possesses a number of sensible accidents which it presents as a group to our perception and through which the substance manifests itself to us. From experience we know that many individuals, for instance, human beings, have similar sensible accidents, and are types of the same class or group of material substances. Other individuals, as a dog and a bird, manifest typical accidents or sensible properties which are abruptly distinct and are types of different groups.

In regard both to structure and to function, we human beings appear to be most abruptly distinct from all other types. Our bodies are delicate and naked, and we must use reason and art in order to preserve ourselves and to attain the things which we require to perfect ourselves and be happy. We are conscious of some of our immanent actions, particularly of our sensations, emotions, thoughts and free activities. We can manifest our sensory and rational life to others by means of sensible signs, not only by gestures, facial expressions and exclamations, but also by words and works of art which we produce deliberately and freely diversify.

We observe that there are in the world many types of organisms which are clearly different from ourselves and from each other. Each of these types appears to act in a manner which is regular. For instance, robins have a similar call and build similar nests. Only the human is versatile and manifests the sensible signs of rational life. No other type of organism constructs and communicates with boundless variety.

The organisms which we call brutes exhibit the signs of sensory life and possess organs more or less similar to our own. The horse and the dog have eyes and ears, and can move themselves toward or away from things which they seem to sense from a distance and to remember. Other types of animals, as the oyster and the earthworm, are less complex in structure

and appear to sense only objects of touch and taste, not objects of sight and hearing.

The organisms which we call plants do not manifest the signs of sensory life and do not appear to have sensory organs. Yet the plants manifestly move themselves by growing, or increasing their quantity from within, and by producing new individuals of their types.

There are many material substances which appear rigid or stable in structure and which do not appear to have parts by which they can move themselves or manifest the signs of organic life. Among these we find various types with sensible properties which are abruptly distinct and clearly different, such as those which we call marble and salt, iron and gold.

Thus through experience we know that the world consists of many types of substances with sensible properties which are abruptly distinct and clearly different. By means of its sensible properties a changeable being manifests to us the nature of its substance. If there were no intrinsic reason for a substance to have certain accidents, or no necessary connection between a substance and any of its accidents, then definite types of substances would not be found in different and changing environments. In nature we do not find the typical human head joined to the body of a dog, but to the human body. The malformations which occur among the various organisms are contingent and exceptional, whereas the typical forms recur as a rule through many generations. As a changeable being appears and acts sensibly, so it is. Each definite and stable type in the world requires as its sufficient intrinsic reason a certain kind of substance. As a changeable being is, so it is apt to appear and to act sensibly. The specific nature of an observable substance is manifested to us through its sensible properties or accidents which are abruptly distinct and clearly different from those of other types. Clearly distinct types, such as a man, a horse and an oak tree, exhibit different properties and activities, which are not merely impressed upon them from without but proceed from within the substances themselves. Therefore these types are different in substance, that is, they



are individuals of distinct species. Hence changeable being is not one specifically, but consists of groups of substances which differ in specific nature.

We find in the world various orders or kingdoms of living and non-living bodies. Human beings constitute the order of intellective or rational organisms. Animals and plants constitute distinct orders of sensitive and vegetative organisms. Among the non-organic bodies there are orders of compounds and the elements.

By means of our intellective life we humans can control and freely diversify some of our activities. We can preserve and perfect ourselves, and can enjoy both sensory goods and the goods of reason. The brute animals can preserve and perfect themselves organically, and can enjoy sensory goods; but they do not appear to enjoy rational goods, such as humorous incidents, beauty, moral virtue, art and science. Man performs rational activities in addition to sensory and vegetative functions. Brutes do not exhibit the sensible signs of rational life. As a changeable being appears and acts sensibly, so it is. Man acts in a manner which surpasses sensory activities. Hence the specific nature of man or the intellective order is essentially more perfect than the sensitive orders and natures. The plants can grow and perfect themselves organically, but they do not exhibit sensory activities. Hence the animals are more perfect than the plants. The non-organic substances tend to preserve themselves by means of their physical properties, such as hardness and crystalline structure; but they cannot move themselves by means of their parts. When they are moved from without, they act on other bodies in ways which are typical of their species, as acids and metals act on each other. Hence the plants and the other organisms are more perfect than the non-living substances.

The clearly distinct and typical organic structures in the various types of organisms are signs of specific differences, because these parts are not contingent accidents but are integral and necessary parts of the substances. The brutes manifest their specific nature especially by their instinctive behavior.

Among the animals we can distinguish many genera and a great multitude of species by contrasting their typical organic structures, the degrees of perfection in their sensory life, and their instinctive behavior. Types of the more perfect species of animals, such as the cat, dog, robin, alligator, frog, trout, honey bee and squid, possess the higher senses, either vision or hearing or both. These animals can sense things which are at a distance and can move themselves with respect to such objects. Types of the less perfect species, such as the clam, earthworm, starfish and jellyfish, lack the higher senses and are simpler in structure and in sensory functions.

Among the plants we can distinguish various genera and a multitude of species by contrasting the perfections of their typical organic structures and vegetative functions. The mosses and ferns, the grape and the apple are clearly distinct and different in regard to their typical structures and functions.

There are many types of non-living substances which have abruptly distinct properties. By means of their color, odor, taste, crystalline form, freezing point, boiling point, and other observable and measurable properties, we can distinguish various genera and many species of compounds and the elementary bodies, for instance, sugar, water, oxygen, the electron and the proton. Among the properties of a compound there are some which are intermediate between those of various elements, and a compound is somehow composed of various elements. Hence compounds are more perfect than the elements.

Thus we see that changeable being consists of distinct orders of substances which differ according to generic and specific degrees of perfection.

A human being is one substance which is not only intellectual but also sensitive and locomotive, vegetative and corporeal. Man possesses in himself the general perfections which are characteristic of the lower orders of nature, and so man is a microcosm or a little world. However, it is clear that the human does not possess the perfections which are typical of the horse or the oak tree, or of any other specific type. By

means of philosophy of nature man tries to assimilate the specific perfections of all natural bodies in a cognitive way.

### Reply to Difficulties

(1) All material substances are of one kind inasmuch as they are changeable beings and pertain to the general order of nature or the cosmos. From their different sensible properties it is clear that material substances do not all pertain to one special order or genus or species.

(2) The cosmos is manifestly rich in the number and variety of things which it contains. Color, sound and heat are accidents of material substances by which these substances act on each other and on our senses. A hot substance can heat a cooler one, and a sounding body can produce a similar sound in another body. When hot or sounding bodies act upon our senses we can sense their own heat or sound more or less perfectly. We perceive that heat and sound are abruptly distinct and different. Things which are abruptly distinct and clearly different are specifically distinct. Hence heat and sound are not of the same species of sensible activity or motion, but are specifically distinct qualities. Some individual substances, especially organisms, are composed of many molecules which are parts of one and the same substance, and are not distinct substances. Molecules which are individual substances are composed not only of particles but also of an extended field, which is something physical. Even the electron and the proton have properties which are clearly distinct and different. There is much more in nature than homogeneous matter and motion. These are not sufficient reasons for the great variety of substances with different properties and activities which constitute the world.

(3) The cosmos consists of many different types of substances which are disposed harmoniously and constitute a complete whole. In regard to the whole as a system there are no conspicuous gaps or defects. But between the living and the non-living, between the sensitive and the non-sensitive, and

between the rational and the non-rational there cannot be an intermediate type of substance. There are gaps between the abruptly distinct and clearly different types of organisms, compounds and elements. Yet within each organic species there is considerable variety among the individuals, and the varieties of one species are similar to those of several other species in accidental respects and in generic perfections. The gaps between the distinct orders and genera are somewhat filled by more general perfections, by distribution, and by accidents which are more or less similar in different types. For example, the ivy and grape vines have some accidents and generic perfections which are similar, and the ape resembles man in some respects. But types such as these have sensible properties which as a group are abruptly distinct and clearly different, and are not one but many generically and specifically.

## II

### THE PRINCIPLES OF CHANGEABLE BEING IN GENERAL

Concerning the principles of changeable being in general there are five questions to be decided: 1. Whether a changeable being has first principles? 2. Whether the first principles are contraries? 3. Whether there are only two or three first principles? 4. Whether one of the first principles is purely potential? 5. Whether there is only one actual principle in each changeable substance?

#### 1. WHETHER A CHANGEABLE BEING HAS FIRST PRINCIPLES?

##### Difficulties

It may seem that a changeable being does not have first principles from which it exists and is made, for the following reasons.

(1) That which is created out of nothing does not have first principles from which it is made. Changeable beings were created out of nothing by the Author of nature. Therefore changeable beings do not have first principles from which they are made.



(2) That which is or exists does not seem to have principles from which it exists and is made, because a being cannot be made from itself, nor from another being which already exists, nor can something be made from nothing by natural power. Changeable beings already exist, and their motion, heat and light seem merely to pass from one to another. Therefore changeable beings do not have principles from which they are and are made.

(3) A principle is something which is first and from which something else proceeds or follows. One is prior to many. Therefore there is only one principle.

(4) That which is divisible without limit seems to have an infinite number of principles, because a being exists and is made from the things into which it can be resolved or divided. Changeable beings are extended and are divisible without limit. Therefore changeable beings have an infinite number of principles from which they are made.

### Solution

We use the term principle in a wide sense to signify any source or origin from which a thing proceeds. Some principles are extrinsic to that which proceeds from them, as an artist who is painting a picture is extrinsic to the picture which is being painted by him. Other principles are within that which proceeds from them and are the intrinsic sources from which a thing exists and is made, as the wood is an intrinsic source of the table which exists and is made from the wood. By the first principles of a changeable being we understand the intrinsic and fundamental sources from which any changeable being exists and is made.

Through experience we know that many things in the world are newly made. Organisms can generate new individual substances, and they can become corrupted and changed into certain non-living substances. These in turn can be changed into other substances which are specifically different, as wood can be changed into ashes. Changeable beings appear to be capable

of change, not only with respect to their accidents, but also fundamentally or substantially.

We notice that changeable beings, as they are made in the course of nature, appear to exist and to be made from some antecedents, not from mere nothing. Things which are produced by natural change appear to proceed from intrinsic principles from which they exist and are made, as ice appears to proceed from water and from whatever else is required as an intrinsic principle from which ice is formed. That which is newly made is distinct and different from its antecedents, and appears to exist and to be made from principles which are distinct and different from each other, somewhat as the color purple appears to proceed from the colors red and blue.

Yet it is clear that neither everything nor all kinds of things are required as intrinsic principles from which any individual changeable being exists and is made. Something brown is not generally required as a principle from which something is made sweet, nor is gold required as a principle from which water is made. Moreover, the sensible properties and the proper activities of a changeable being are limited in number, and appear to proceed from a limited number of intrinsic principles. Furthermore, some things proceed from others, as the color green proceeds from the colors yellow and blue, or as compounds proceed from elements; whereas the principles of a changeable being are the sources from which a changeable being exists and is made. Hence not all things are intrinsic principles.

Thus we see that a changeable being exists and is made from intrinsic principles which are limited in number and are distinct and different from each other. Certain of these intrinsic principles do not proceed from others, because the number of principles in a changeable being is limited; nor do they proceed from each other, because they are different. Things which do not proceed from others, nor from each other, but from which any changeable being exists and is made are the intrinsic and fundamental sources or first principles of a changeable being. Therefore a changeable being has first principles from which it exists and is made.

## Reply to Difficulties

(1) The questions concerning the creation of a being out of mere nothing pertain to metaphysics, not to philosophy of nature, because these questions concern being as such, not changeable being exclusively. In the course of nature changeable beings are not made out of mere nothing, but from certain antecedents, and so they have first principles for which they exist and are made.

(2) Sensible motions and qualities such as heat and color are accidents, not substances. Accidents do not have their being in themselves simply, but in a substance, and the same accident numerically does not pass from one substance to another. Through experience we know that a hot substance can act upon a cold one and can make it more or less hot. When such a change takes place, the same heat numerically does not pass from one substance to another, nor is some new heat made simply, because heat is not a substance, and is not apt to be or to be made simply. In this case, a cold substance is made hot, and some heat is newly made or made more intense in a substance which already exists and which is capable of becoming hot. Similarly, the motion of the self when we walk is not made simply, but is newly made in the self.

Inasmuch as a being is something actual it cannot be made, because it already is. Through experience we know that change takes place, and that changeable beings are newly made. A changeable being is not made from mere nothing in the course of nature, nor from an antecedent being inasmuch as this is something actual. Between an actually determined material being and mere nothing there is a certain medium which is a potential principle, or something which is capable of receiving a new determination, somewhat as a cold body can become hot.

(3) One is prior to many inasmuch as it is an extrinsic principle from which many things proceed, as an artist is prior to many works of art which proceed from him, or as a divisible whole is prior to the parts into which it can be divided. But that which is made as things are made in the course of nature

proceeds from more than one intrinsic principle, and so many intrinsic principles are prior to such a one.

(4) Changeable beings appear to be composed of extended parts into which they can be divided. Yet each natural body is limited in its extension or quantity, and the individuals of a species do not vary indefinitely in regard to their quantity. Human beings, for example, can be large or small, but within limits of size. Through experience we know that natural bodies cannot be divided indefinitely without a change in species taking place. A man can have his arms and legs cut off and remain a man, but he cannot have his head cut off and remain a man, nor is an amputated arm or leg a human being. Hence there are certain first and substantial principles which are required for a man to exist and to be made. Similarly, all natural bodies have first principles from which they exist and are made.

## 2. WHETHER THE FIRST PRINCIPLES OF A CHANGEABLE BEING ARE CONTRARIES?

### Difficulties

It may seem that the first principles from which a changeable being exists and is made are not contrary to each other, for the following reasons.

(1) Things which are extremely distant and different from each other and which pertain to the same genus are called contraries, such as the red and the blue, the sour and the bitter. Something sour can become red, although sour and red are rather disparate than different from each other, and are not contraries. Therefore the principles from which a changeable being exists and is made are not contrary to each other.

(2) Contraries are positive things, such as sweet and salt. A changeable being can be made from principles, not all of which are positive things. Something dark can become bright, although the dark seems to be merely the absence of light. Therefore the principles of a changeable being are not contraries.

(3) The first principles from which a changeable being exists



and is made do not proceed from each other. Contraries can proceed from each other, as black can proceed from white, and white from black. Therefore the first principles of a changeable being are not contraries.

(4) Contraries such as blue and yellow oppose and resist each other, and cannot coexist in the same body or in the same part of a body, at least not in intense degree. The first principles from which a changeable being exists and is made coexist in the same changeable substance. Therefore the first principles of a changeable being are not contraries.

(5) Changeable substances are not contrary to each other, because they are abruptly distinct in species and cannot be changed as colors or sounds can be changed from one extreme to another. The first principles from which a changeable substance exists and is made are fundamental or substantial principles. Therefore the first principles are not contraries.

### Solution

We know through experience that material substances can be modified accidentally and that they can be substantially generated and corrupted. We notice that bodies which are hot or cold do not heat or cool other bodies which are equally hot or cold. We find that moving bodies do not act on other bodies which are moving with similar velocity and direction. It is clear from experience that change does not take place indiscriminately. We do not observe that anything whatever proceeds from anything whatever, except by accident: when something is present which is not required for a particular change. A man who is a carpenter may become a writer, although it is not necessary that one be a carpenter in order to become a writer. The world appears to consist of changeable beings which are produced in a certain order from principles of a certain character and which are corrupted in a certain order.

We observe, on the one hand, that when something becomes black, it is made so from something not black. Yet it is not

made from anything whatever which is not black, such as sweet or hot, because things which are neither sweet nor hot can become black; but it is made so from something white, or of another color. When something becomes hot, it is made so from something cold or cool. When a statue is carved, it is produced from something which was crude or unformed. When stones or other things are placed in order, the order is made from things which were scattered. When a compound is made or an ovum fertilized, the combination is made from things which were uncombined but suited for union.

On the other hand, when something ceases to be black, it becomes white or another color. When something ceases to be hot, it becomes cool or cold. When something ceases to be formed, it becomes unformed. When bodies cease to be ordered, they become scattered. When a compound or organism becomes corrupted, it is changed into things which are uncombined.

From experience it is evident that changeable beings are made from principles which are dissimilar and properly opposed to each other, and that they become corrupted into their proper opposites. Moreover, that which is made and which becomes corrupted does not exist before it is made, nor after it becomes corrupted. Hence that which properly becomes something else, as the white or non-black becomes black, or as the cold becomes hot, involves the non-being or opposite of that which is made; and that into which something becomes corrupted, as the combined becomes uncombined, involves the non-being or opposite of that which becomes corrupted. Things which are dissimilar and properly opposed to each other, as white or non-black and black, cold and heat, order and disorder, union and disunion, are said to have contrary characters, and are called contraries. Changeable beings exist and are made from principles such as these. Therefore the first principles from which a changeable being exists and is made have contrary characters and are contraries.

### Reply to Difficulties

(1) The intrinsic principles from which a changeable being proceeds are those which are required for its being and being

made. In order that something can become red, it is necessary that it be contrary to red, but it need not be sour. Hence the sour as such is not a principle of something which exists and is made red, but in this respect is merely accidental.

(2) Contraries in the strict sense of the term are positive things, such as sour and bitter tastes, or red and blue colors. Yet things such as heat and cold, light and dark, are called contraries in a wide sense of the term. The first principles of a changeable being are contraries in the wide sense.

(3) Contraries can proceed from each other inasmuch as they can succeed each other in a subject or substance, as black can succeed white in a subject which is white. But black itself is not composed of the non-black, nor white of the non-white. Contraries do not proceed from each other in the sense that one is composed of the other. The first principles of a changeable being do not proceed from each other, or are not intrinsically composed one of another, because they are the fundamental contraries and are opposed to each other as light and dark.

(4) Blue and yellow are contraries in the strict sense, and they exclude one another in the same subject. A green can proceed from yellow and blue, not inasmuch as these are yellow and blue, but inasmuch as they are non-green, because that which properly becomes something else includes the non-being of that which is made from it, whereas that which already is does not become. Blue and yellow as such are extrinsic terms from which something becomes green. Anything which is non-green, or contrary to green in a wide sense, can become green. Likewise, when something round becomes square, the round figure is an extrinsic term. The square is not intrinsically made from the round as such, but from the non-square and the square figure. The first principles of a changeable being are contraries in the wide sense, and are opposed as non-green and green, or non-square and square. Principles such as these exclude one another from themselves, and one is not composed of the other; but they are included in that which proceeds from them and which is intrinsically made from them.

(5) Material substances of different species are not contrary to each other in the strict sense, because they are abruptly distinct, somewhat as triangles and squares are distinct. But if we consider the properties of various substances, and particularly their differences, such as living and non-living, sensitive and non-sensitive, they are contrary to each other in a wide sense. The first or fundamental principles from which a changeable being exists and is made are not contraries in the strict sense, but in the broad sense, somewhat as dark and bright.

### 3. WHETHER THERE ARE ONLY TWO OR THREE FIRST PRINCIPLES OF A CHANGEABLE BEING?

#### Difficulties

It may seem that there are not three first principles from which a changeable being exists and is made, for the following reasons.

(1) Each changeable being exists and is made from its own principles. There are changeable beings of many different kinds, and organisms particularly appear to be very complex and to be made from many principles. Therefore there are very many principles of a changeable being.

(2) The first principles of a changeable being are contraries. Only one thing is contrary to another. Therefore there are only two first principles of a changeable being.

(3) The first principles of a changeable being are the fundamental sources from which it exists and is made. A changeable being can be made from a subject and one form, as something dark can be made bright. Therefore there are only two first principles of a changeable being.

(4) A changeable being is made from the principles into which it can be resolved. Each changeable being can be resolved into a subject and a form, as hot water can be resolved into water and heat. Therefore there are only two first principles of a changeable being.

## Solution

Through experience we know that the principles from which a changeable being exists and is made are contraries in a wide sense, such as cold and heat, or dark and bright. But if cold is merely the absence of heat, and dark merely the absence of light, it does not seem that a changeable being can be made from them. Heat does not act on coldness and make it hot, nor does light act on darkness and make it bright, because contraries are not intrinsically composed one of another, and because that which is newly made in the course of nature requires some positive antecedent from which it exists and is made. Moreover, heat and color are accidents. They do not exist in themselves, but exist and are made in a subject or substance. Changeable substances also are made in the course of nature, and it seems that they cannot be made from the mere absence or privation of something substantial, together with only one positive principle. Hence it seems that there must be a third principle which is the subject of the contrary principles from which a changeable being exists and is made.

When we examine things which are made or modified in nature, it appears that there is always a subject in which change takes place and from which something is made or which becomes modified. We notice that a changeable being can be made either according to some accidental mode, as cold water can be made hot, or according to its very substance, as ashes are made. Hence things are not said to be made in only one sense of the word, but in many senses, according to the diverse things which are made.

We observe that a change takes place between two terms, that is, from something to something else. When some water is heated or an apple turns red, it is the same water that was cold which becomes hot, and the same apple that was green or yellow which becomes red. There is something which remains throughout the change, namely, the water or the apple. There is also something which does not remain throughout the change, namely, the contrary of heat or of red, because the water is



no longer non-hot after it becomes hot, and the apple is no longer non-red after it becomes red. Something which remains throughout a change cannot be the same, at least in concept, as something which does not remain. Hence the non-hot which becomes hot, or the non-red which becomes red, has two aspects, one of which remains and the other does not remain throughout a change. Likewise, when something which is non-sweet becomes sweet, or when the non-round becomes round, there is something involved which has two aspects, one of which remains and the other does not remain throughout a change. Something which thus remains throughout a change is called the subject of the change. The term from which a change proceeds and which does not remain after the change is completed is the opposite or privation of the term to which the change tends. The positive term to which a change tends and which is newly made in the subject of the change is called the form, for example, heat or redness. Some changes proceed from a positive term or form to the privation of the form in the subject, as when hot water becomes cold, or something bright becomes dark.

Changeable substances are made when organisms and compounds are generated. The making or production of a thing involves the beginning of its being; and so only that which did not exist fundamentally or substantially before it was made is made simply. A human being, or a dog, or any substance which is generated, was not merely not a human being, or a dog, or any substance before it was generated, but was not simply, or did not exist. Hence when a substantial change takes place in nature something is made simply. However, we observe that new substances are generated from something antecedent, such as seed or elements, somewhat as a green proceeds from a yellow and a blue. When a new substance is generated, it seems that there is always a subject which remains throughout the change and which was deprived of a substantial form which is newly made in the subject.

Moreover, when we examine the ways in which changeable

beings are made, it is clear that there is always a subject from which they are made. Certain things are made by a change of feature or figure, as a smile or a posture; others are made by addition or confluence, as a river from many streams; others by subtraction or erosion, as a mountain or valley; others by composition, as compounds and the higher organisms; others by division, as the lower organisms; others by growth, as leaves and feathers; others by alteration, as the color and odor of flowers and fruits. From all these cases it is clear that whatever is made in the course of nature is made from a subject which was deprived of a form which is newly made in the subject.

In ordinary speech we sometimes designate the subject of a change and the form to which a change tends without expressing the privation which is involved. We say, for example, that some water becomes hot, or that a pumpkin turns yellow. We express the subject, the privation and the form when we say that a dark body becomes illuminated, or that a sick man becomes well.

From this analysis we can determine the number of the first principles from which a changeable being exists and is made. The principles which constitute a changeable being are the positive things from which a changeable being exists and is made, and which are in the thing which is made. Everything which is made in the course of nature exists and is made from a subject and a form, and consists of a subject and a form, because a changeable being is composed of the things into which it can be resolved, and each can be resolved into a subject and a form, somewhat as hot water can be resolved into water and heat. Hence the first principles which constitute a changeable being are a subject and a form.

But the subject from which a changeable being is made has two aspects: the positive and the privative, somewhat as a flower without an odor, or an apple without red. The subject, inasmuch as it is something positive, is a component principle from which a changeable being both exists and is made, some-

what as a statue exists and is made from marble or bronze. The privation of a form which can be made in a subject does not remain in the thing which is made, as the marble does not remain unformed after the statue has been carved from it. Hence privation is not a component principle of a changeable being. Yet a changeable being proceeds from a subject that is deprived of a form which can be made in it, as a red apple proceeds from one which is non-red, and a yellow apple from one which is non-yellow. Even when a subject has a certain form, for instance, an apple with the color green, it is deprived of an opposed form, such as red. But an apple as a subject merely happens to be deprived of red, and the marble happens to be deprived of a figure which can be made in it. Likewise, any subject with a certain form happens to be deprived of another form which it can receive. A changeable being neither exists nor is made without privation of some form. Hence privation is a principle from which a changeable being exists and is made, although it is a principle by accident, inasmuch as the subject happens to be deprived of a form which can be made in it.

Thus there are two first principles from which a changeable being exists and is made, and of which it is composed, namely, the subject and the form. There are three first principles from which a changeable being exists and is made if we distinguish privation, which is a principle by accident. The principles are contraries if we consider the subject with privation as one principle, opposed to the form which is the term to which a change tends, somewhat as something cold and heat are contraries, or something non-red and red. But privation and form are not found without a subject. Moreover, the subject and the form are not contraries, because they coexist as component principles of a changeable being. The first principles from which a changeable being exists and is made are not contrary to each other simply, but only by reason of privation in the subject; nor are they simply two, because the subject has two aspects, the positive and the privative, and these with the form are three principles.

## Reply to Difficulties

(1) At this point in philosophy of nature we inquire concerning the first principles of changeable being in general, and we use particular instances only for the sake of general analysis and illustration. The proper principles of various kinds of changeable beings are considered in special parts of philosophy of nature. Through experience we know that certain changeable beings, particularly the higher organisms, are very complex in structure. An organism has many accidents, such as color, figure, density, heat and powers of operation, and is composed of many organs and elements. However, only the fundamental sources from which a changeable being exists and is made are its first principles in the strict sense of the term. The principles which do not proceed from other principles, nor from each other, but from which any individual changeable being exists and is made are a subject with privation and a form.

(2) The first principles from which a changeable being exists and is made are not mere contraries without a subject. They are contraries and a subject in which a privation and a form succeed one another.

(3) The subject from which a changeable being exists and is made is always deprived of certain forms, because even when it has one form it lacks others which it is capable of receiving, somewhat as an apple which happens to be green or non-red can become red. Hence privation is also a principle, although by accident.

(4) The constituent principles from which a changeable being exists and is made are the subject and the form, because these are the positive and essential components of all that is made or generated in the course of nature. But a subject which has one form always lacks others which can be made in it. The privation of a certain form in a subject is required for a changeable being to be and to be made, because that which already is does not become, nor is something made from mere

nothing by natural power. Hence privation, which is the lack of a form which can be made in a subject, is also a principle.

#### 4. WHETHER THE FIRST SUBJECT IS PURE POTENCY?

##### Difficulties

It may seem that the first subject from which a changeable being is and is made is not a purely potential principle, for the following reasons.

(1) Changeable beings appear to be and to be made from a material subject, such as water or air. A material subject such as water is an actual principle. Therefore the first subject from which a changeable being is made is an actual principle.

(2) The first subject from which a changeable being is made is something real. Everything which is real seems to be actual. Therefore the first subject is an actual principle.

(3) The first subject from which a changeable being is made is something which receives the form which is made in it. Anything which receives a form seems to be an actual principle, as the wax which receives the form of a seal. Therefore the first subject is an actual principle.

(4) The first subject from which a changeable being is made is something which cannot be generated or corrupted by natural power. Something which cannot be generated or corrupted by natural power seems to be the true and actual source of changeable beings. Therefore the first subject is an actual principle.

(5) The first subject from which a changeable being is made is something good, because good things, such as organisms and compounds, are made from it. The good is something actual, because that which is not actual seems to pertain to defect or evil, which is the opposite of good. Therefore the first subject is something actual.

(6) The first subject from which a changeable being is made is really the same as privation. Privation is not a potential



principle, but the absence of form, or non-being. Therefore the first subject is not a purely potential principle.

### Solution

We know through experience that new individuals of the various species, both living and non-living, are generated in the course of nature, and that changeable beings are changeable simply or substantially. It is clear, on the one hand, that a substance which actually exists cannot be made, because it already is. On the other hand, it is clear that a substance cannot be made from mere nothing by natural power. If new substances were made from mere nothing in the course of nature, a stone or a horse or any other substance could be made in the same way, and a subject with special dispositions would not be required for the production of a substance of determined species. From experience we know that an antecedent subject with special dispositions is required for the production of water, and of a dog, and of each specific type of natural body. Hence new individual substances are made from some primary or substantial subject which is capable of receiving a new substantial actuality and of losing the substantial actuality which it previously had. The substantial actuality of the antecedents from which a new substance is generated is extrinsic to the one which is newly made, which is distinct and different from its antecedents. A subject which is capable of receiving a new substantial actuality, and of losing the one which it previously had, of itself has neither the one nor the other. Therefore new individual substances are made from a primary subject which of itself lacks substantial actuality, which it is capable of receiving and which can be made in it. Such a subject is a first and purely potential principle. It is a first principle because it is a subject which of itself lacks the first or substantial actuality, and so it is not made from or composed of any other principle. It is a purely potential principle because it is capable of receiving a substantial actuality which can be made in it and which it does not have of itself. Hence the first subject

from which a changeable being is and is made is a purely potential principle.

### Reply to Difficulties

(1) Both accidental and substantial changes occur in the course of nature. The subject of an accidental change is an actual substance, such as water or iron. When an accidental change takes place, as when water becomes hot, there is nothing which is made simply, because the same substance continues to exist after an accidental change is completed in it. An existing material substance or natural body, which is the subject of accidental changes and of accidents which are made with it and in it, is called second matter. Second matter is itself a changeable substance which is and is made from its own first subject and substantial actuality.

When a substantial change takes place and a new organism or compound is generated, an individual substance is made which did not exist before it was made. The first subject from which a changeable substance exists and is made is a purely potential principle, because it is something which is capable of receiving a new substantial actuality and of losing the one which it previously had. This subject is called first matter, because it is the first subject from which a changeable being exists and is made, or the first subject of change.

(2) That which is simply real in nature is second matter, such as a man or a horse. Second matter is a subject which already has its substantial actuality or being, and so it does not receive its being simply through anything which is made in it or added to it. From second matter a new substance can be made only by accident, inasmuch as the one which is actual is not the one which can be made from it, somewhat as a black body can become white by accident, inasmuch as it happens to be non-white. A body does not remain black after it becomes white, nor does a changeable substance remain the same, individually or specifically, after it has been changed substantially, as the wood does not remain after it has become ashes.

A changeable being is made properly from its own component principles which are in it after it is made, whereas it is made only by accident from something which is not in the one which is made. When a new substance is generated, it is made properly from first matter, that is, from a subject which of itself lacks substantial actuality, and which receives its being or becomes actual through something which is newly made in it.

First matter is something real in nature, because it is a component principle of a changeable substance. It is not an actual being, but a potential one. It is not a complete substance, but the purely potential part of a changeable substance. The first subject of change or first matter is a certain medium between mere nothing and an actual being. This subject is something which of itself lacks substantial actuality, and is not of itself apt to exist, but is ordained to existence through the substantial form which is made in it. First matter and substantial form together constitute a complete changeable essence which is apt to exist. When a substantial change takes place, a new substance is generated from the potentiality or first matter of one or more substances which previously existed, and the other or others become corrupted. In this way the generation of one substance is the corruption of another, and first matter always has a substantial form.

(3) The subject which receives accidental forms is an actual substance or second matter, because accidents do not have their being simply in themselves, but in a substance which exists simply in itself. The subject which receives a substantial form is something which of itself lacks substantial actuality and is a purely potential principle. First matter receives a substantial form in a purely passive way, through the action of an extrinsic principle, and the matter exists with dependence on the substantial form which it receives.

(4) We say that something is true when we know that it is genuine or conformed to its standard. In particular we say that a judgment or statement is true when we know that it corresponds to the thing concerning which the statement is

made. We know through experience that changeable substances are made simply in the course of nature and that they are not made from mere nothing. A new substance cannot be made intrinsically from a subject which of itself has substantial actuality, because that which already is a substance cannot become one simply. Hence changeable substances are made from a subject which of itself lacks substantial actuality, and which is a purely potential principle. This subject, or first matter, cannot be generated in the course of nature, because every generation requires a subject, and first matter is the first subject from which a changeable being exists and is made. First matter can be corrupted by accident, inasmuch as it was deprived of a certain substantial form which it no longer lacks after it has received the form, as something non-green becomes corrupted when it becomes green. But first matter cannot of itself become corrupted, because it is the term of corruptive change, and the changeable or corruptible substance is already corrupted when it is reduced to first matter. Hence the principle which cannot be generated or corrupted in the course of nature is not the substantial actuality of a changeable being, but its substantial potentiality. The world endures because generation and corruption are concomitant. New substances are generated from the first matter of other substances, and these antecedent substances become corrupted.

First matter is not of itself knowable, because things are and are knowable through their formal or actual principles, whereas first matter is the subject which receives a substantial form, and is something which of itself lacks all form and actuality. Yet we can know first matter by analogy or proportion. We know, for example, that wood of itself lacks all the artificial forms which can be made in it. But the wood sometimes has one form, for instance, that of a table; and sometimes it has another form, for example, that of a chair. Hence wood is distinct from all the artificial forms which can be made in it. We know also that the wood sometimes becomes ashes. Hence something which exists under the form of wood sometimes exists under the form of ashes. Thus, something which

is in wood and in ashes, and which is something distinct from the form of wood and from the form of ashes, is in a natural substance somewhat as wood is in a chair or table. Yet first matter is not an individual substance, such as the wood. First matter does not of itself have form or unity in act, but is a being and unity only inasmuch as it is potency with respect to a substantial form, which it receives in a purely passive way, on which it depends for its actuality, and through which it is knowable.

(5) Anything which is desirable is said to be good. From experience we know that everything seeks to preserve its own being and to achieve its own perfection. Hence a complete substance is that which is good, whereas the distinct perfections which a substance has or seeks are that by which it is good. First matter is not of itself good, because it is a purely potential principle. Nevertheless, first matter has an aptitude for good, inasmuch as it is a subject which can receive a substantial form by which it has actual being and perfection. In this respect first matter is distinct from mere nothing, which cannot receive a perfection. First matter is not desirable for anything which it has of itself, but it is inclined to a substantial form by which it is perfected. Even when first matter has one form it is inclined to all other forms which it is capable of receiving, and in this sense it always desires substantial forms. First matter is not evil, because evil is opposed to good, whereas the matter is not opposed to the form by which a thing exists and is good, but is inclined to the form. Moreover, first matter is useful for the substantial form which is made in it and for the substance which is made from it.

(6) By privation we understand the absence of a certain form in a subject which is capable of receiving the form. Privation is distinct from negation, because negation is the absence of a form without a subject capable of receiving the form. A stone is said to be blind in the negative sense of the term, whereas a man is blind in the privative sense of the term.

When a privation is considered as the mere absence of a



form, it is distinct from the potential principle or first matter, because the absence of a form is itself non-being, whereas first matter is non-being only by accident, inasmuch as it happens to be deprived of a certain form. Moreover, first matter is a certain medium between nothing and an actual being, and is a being inasmuch as it is potentially a changeable being. Furthermore, first matter is an essential part of a material substance, is inclined to substantial form and perfection, and is useful for the form and for the material substance. But a privation is not a potential being, nor is it inclined to a form and perfection, because it ceases when the form is produced. Hence privation, unlike matter, is opposed to being and to good, and pertains somehow to evil, which is the opposite of good.

Yet first matter has privations, because even when it has one form it is deprived of all the others which it is capable of receiving, and which it seeks or desires because it is capable of receiving them, not because it is deprived of them, since it is deprived of them only by accident. Still, first matter does not desire the forms without being deprived of them, because desire is always for something which is not possessed. Hence we must say that first matter has two aspects, namely, potency and privation. First matter is really the same as privation, because the matter or potency is something real, and is potentially a changeable being, whereas the privation is the absence of substantial forms in and including the matter. A certain privation is required for a change, and matter always has privations of the forms which it does not possess. But the privation of a form ceases when the form is made in the subject. Hence a changeable being is not composed of privation. Privation is only by accident, a first principle from which a changeable being exists and is made, inasmuch as the matter happens to be deprived of a certain form which it is capable of receiving. But first matter of itself is a first and purely potential principle from which a changeable being exists and is made, and which is in the one which is made, because it is the subject which receives a substantial form.

5. WHETHER THERE IS ONLY ONE SUBSTANTIAL FORM IN A  
CHANGEABLE SUBSTANCE?

Difficulties

It may seem that there are many substantial forms in a changeable substance, for the following reasons.

(1) A changeable substance is composed of the principles from which it is made, and into which it can be resolved. Compounds and organisms seem to be made from various substances, and they can be resolved into substances of many specific types. Therefore there are many substantial forms in a changeable substance.

(2) Many substantial forms are produced from the matter of a changeable substance, because many specific types are generated, at least in part, from the matter of each one. Whatever is produced from matter was contained in the matter. Therefore there are many substantial forms in a changeable substance.

(3) When new substances are made in the course of nature, their substantial forms do not come from without, but either were in the matter or are made from nothing. Something cannot be made from nothing by natural power. Therefore there are many substantial forms in a changeable substance.

Solution

A first actuality or substantial form, which is something distinct from first matter, is required as a component principle from which a changeable substance exists and is made in the course of nature. When a new substance is generated, a new substantial actuality is manifested by new individual or specific sensible properties. For example, when some wood is burned, the wood becomes corrupted and ashes are generated. Such a change is not the total conversion of one or more substances into new substances. If this were the case, one substance would be entirely corrupted and another would be produced from mere nothing. But substances are not produced from

mere nothing by natural power. Hence something of the antecedent substance remains in the one which is newly generated. The substantial actuality of the antecedent substance does not remain, but the substantial potentiality or first matter remains and receives a new actuality. A changeable being is not made from first matter alone, because first matter is a purely potential principle. Hence a substantial form distinct from first matter is required as a component principle from which a changeable being exists and is made.

The substantial form of a substance which has been generated was not merely hidden in the antecedent matter from which the substance was generated. If this were the case, a new substance could not be made simply, because that which already is cannot be made. The substantial form itself is not the whole substance of a changeable being, because material substances are naturally changeable, whereas that which already is an actual substance does not become one simply. Moreover, if the substantial form were the whole substance of a changeable being, it would be entirely corrupted and a new substance would be made from mere nothing when a substantial generation takes place in nature. But we know from experience that natural changes require a subject, and that something from an antecedent substance remains in the one which is newly altered. Furthermore, a new substance cannot be evolved from the matter of an antecedent substance unless another substantial form is made in the matter. If the substantial form of the new substance was actual in the previous substance, then nothing is made simply; if it was merely potential, then it could not appear actual if nothing new is made in the matter. Hence the individual substances, both living and non-living, which are made in the course of nature are composed of a substantial form together with first matter.

By observing the manner in which a changeable being appears and acts sensibly, we can determine whether there is only one substantial form from which it is and is made. Each individual substance appears and acts as one being simply. The

unity of a human being is especially clear from the fact that, although we are very complex in structure and perform many different operations, yet one intense operation, such as attentive thinking or swift running, impedes other operations such as hearing or digestion. This would not be the case if the first actual principle of all our operations were not essentially one. Moreover, we are conscious of the self as one being simply, which lives and moves and understands. A changeable being cannot be one simply unless it is made from one substantial form, because it has its unity from the same principle from which it has its being or actuality. Furthermore, we notice that generation and corruption are concomitant in nature. The generation of one substance involves the corruption of another or others. When a new substance is generated, the first subject of the change loses the substantial form under which it previously existed and receives another substantial form, individually or specifically distinct from the one which it had. Hence there is some incompatibility between distinct substantial forms which prevents them from being together in the same individual substance.

The incompatibility between distinct substantial forms comes, in the first place, from the nature of a substantial form as such. A substantial form is the actuality by which first matter is actualized. It is the first actual principle from which a changeable being is made simply and is apt to exist in itself and to be the subject of accidental forms. A substantial form is the first actuality which is in a substance and which underlies all the other actualities in the substance. A substantial form gives being simply, whereas an accidental form gives being in a certain manner, such as round, white or hot. When the first matter receives a new substantial form, the one under which it previously existed is expelled, because only one substantial form supplies the actuality which is absolutely first, from which a changeable being exists and is made simply.

In the second place, distinct substantial forms are incompatible and cannot coexist in the same subject because each

is apt to constitute, together with the first matter, a complete essence which is distinct from all others individually or specifically.

### Reply to Difficulties

(1) A changeable substance is composed of the principles which are in it after it has been made, and into which it can be resolved properly, not by accident. An individual substance is one being simply, or a primary unit, and is not composed of many complete substances. A compound or organism is made by accident from various types of elements or other actual substances, inasmuch as the first matter of these substances happens to be deprived of a substantial form which can be made in it. A new substance is made properly from its own constituent principles, which are the first matter and a new substantial form. Likewise, a compound or organism can be resolved by accident into substances of various types, each of which is made properly from first matter derived from the previous substance and from a new substantial form. The substantial forms of the substances from which a compound is made do not remain actual in the compound, because there is only one substantial form in an individual substance. As types of different species are unequal in perfection, so different substantial forms differ in perfection. The more perfect form includes in itself the general perfections of the less perfect, somewhat as the number five includes two and three, or a pentagon includes three angles and two more.

(2) When a substance is produced from something in which it was contained actually, as when a coin is produced from a purse, nothing is made simply, because the substance already existed before it was produced in this manner. But when a substance is generated in the course of nature, a being is made which did not exist before it was made. A changeable being is made properly from first matter which remains from a previous substance and from a new substantial form. The substantial form of the new substance was not contained actually in the



matter of the previous substance, because the new substance is made simply. First matter is of itself pure potency, and has a merely passive inclination or proportion to substantial forms. The substantial forms to which first matter is of itself passively inclined and proportioned are contained potentially, not actually, in the passive potency of the matter, somewhat as the movements to which our power of running and jumping is of itself inclined and proportioned are contained potentially, not actually, in the active potency of the locomotive power. The potency of first matter extends to all the substantial forms which are dependent upon matter in order to exist and to be made, although each substance requires certain dispositions in the matter from which it is made and forms succeed one another in matter in an orderly way. A substantial form which is dependent upon matter in order to exist and to be made is contained within the scope of the potency of matter, and is made by the change by which the matter is moved or changed from potency to actuality. Such a form is said to be produced or educed from the potency of matter.

Λ substantial form which is not dependent upon matter in order to exist is not contained in the potency of matter in such a way that this form can be produced from matter, or made by a change by which matter is moved from potency to actuality, but only in such a way that matter can be united to it. In a special part of philosophy of nature proof is given that the human substantial form, or the intellective soul, is not dependent upon matter in order to exist.

(3) From our experience of the works of nature and of human art, it is clear that the forms of the things which are made do not come from outside the matter but are made in the matter by the action of competent agents. When a statue is carved, the form of the statue is made from nothing of itself. Likewise, when a substance is generated, a substantial form becomes actual which previously was not, and is made from nothing of itself. Yet forms are not made without an antecedent subject. Moreover, a changeable substance is that

which exists and is made simply in the course of nature. A substantial form which is dependent upon first matter in order to exist and to be made is not made simply, because it is not a complete substance. It is not that which exists and is made simply, but the first actual principle from which a changeable being exists and is made. Such a form was contained in the potency of matter, and when the substance which has been made from it becomes corrupted, the form ceases to be actual and becomes potential, or returns to the potency of matter.

By natural power something cannot be made from mere nothing, that is, from the absence not only of a form but also of a subject capable of receiving the form. Through experience it appears that a substance whose substantial form is contained in the potency of first matter can be produced from the matter by natural power. Hence first matter and a substantial form which is contained in the potency of matter cannot be entirely diverse, but in some way are one. When a substance is generated from the potency of first matter, something which is in potency becomes actual. Hence first matter is potentially something which the substantial form is actually. First matter and the substantial form are not of themselves complete substances, but together they constitute a substance which exists and is one simply. Hence first matter and the substantial form are one inasmuch as together they constitute one changeable being. But a being cannot be one simply, or a primary unit, and yet be made from many principles, unless one principle from which it is composed is purely potential, and the other is a first actual principle or a substantial form, because a being exists and is one simply by reason of its first actual principle. There is only one first actual principle or substantial form in one substance. The substance, or that which exists simply in itself, is the subject in which accidental forms inhere. Hence first matter and the substantial form are united immediately, without any intrinsic bond distinct from themselves by which they are held together, somewhat as a smile is united to a face. First matter and the substantial form are joined by

the action of a competent agent, which moves the matter from potency to actuality, or which, as in the generation of a human being, disposes the matter and applies it to the substantial form. First matter and the substantial form together constitute the essence of a changeable being which is made simply, and which is apt to be in itself and to be the subject of accidental forms.

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## SCIENCE AND PHILOSOPHY



THE system of education which generally prevails in English-speaking countries bears many traces of the positivistic past in which it was developed, and has produced an atmosphere or mental outlook which, though favorable to the progress of the physical sciences, is definitely alien, if not hostile, to any proper appreciation of philosophic thought. Most people learn the rudiments of physical science and mathematics at school, but remain in absolute ignorance of even the very nature of philosophy; whereas, in many continental countries, philosophy figures conspicuously in the scholastic curriculum, with the result that the students can face life with a broad and universal outlook denied to those who have become acquainted with only one attitude and approach to the problems of life, and who turn to science to afford them the explanation of the universe. A public opinion which is unfavorable to, because ignorant of, philosophy has thus been created, and the philosopher has practically no common ground on which he can meet his public. For most people, philosophy is regarded as a sort of abstract theorizing about the facts of science, to whose methods and criteria it is bound. In practice this attitude, which is not only that of the man in the street but of many scientists also, amounts to a denial of philosophy as a distinct and independent branch of knowledge; and the philosopher comes to be regarded as a man who, through indolence or incapacity, shirks the detailed research of science, and contents himself with speculations or hypotheses built upon the facts which scientists have discovered at the cost of so much labor. In an attempt to explain the position of the philosopher in relation to the scientist, the following pages have been written.

The distinction between the scientific attitude and the philo-

sophical attitude<sup>1</sup> can only be rightly understood in the light of the historical causes which are responsible for their confusion. This historical retrospect will introduce us to the properly philosophical doctrine as to the relation of the sciences to philosophy; and in conclusion we will exemplify our conclusions by applying them to certain subjects on which science and philosophy seem to be in conflict.

We can trace back the movement which substituted science for philosophy to the Renaissance,<sup>2</sup> but it is above all in the doctrines of Descartes that we can see the germs of the whole later development both of science and of modern philosophy. To Descartes is due the antithesis "nature-spirit" which was to dominate later philosophy, thus giving it an anthropocentric trend, and setting it on the high road to idealism. His concept of man as a mysterious union of two complete substances, one spiritual, the other extended, each endowed with its own independent life and in opposition to the other element, led to the regarding as the real man the thinking "I," the soul, whose essence is pure thought, and which has no direct contact and interaction with the body in the acquisition of knowledge. Knowledge, therefore, cannot begin in the senses, and sensation itself is a form of thought, so that other animals than man are pure machines; our real ideas are infused by a kind God, whose veracity is sufficient criterion of truth for us. Hence the proper method of knowledge is not discursive reasoning, but intuition; we have certain primitive ideas, clear and evident to the original vision of the mind, and deduction is but the process of combining these intuitions. But knowledge represents reality;

<sup>1</sup> Modern usage of the word "scientific" cloaks an equivocation which may lead people to regard philosophy as "unscientific." The word "science" is now generally only applied to the body of the positive sciences; and in distinguishing the scientific and philosophical, we mean that philosophy is distinct from these sciences, with methods and aims specifically its own. But philosophy is a science in the technical sense of the word, and more perfectly than the particular sciences, as we hope to make clear in the course of this article.

<sup>2</sup> The medieval Platonists, especially Robert Grosseteste, had already arrived at some kind of pan-mathematicism; cf. C. Dawson, *Mediaeval Religion*, London, 1934, Sheed and Ward, pp. 81-99.



and thus we get to the fundamental principle of the Cartesian philosophy: that the real is not to be defined in relation to existence, as the traditional school held, but as that which appears to the mind with clarity and distinction.<sup>3</sup>

By thus creating an artificial chasm between soul and body, and by denying that the body is an essential instrument of the soul in the acquisition of ideas, thus contributing to its perfection, Descartes restricted knowledge to a pure activity of the soul, which consists principally in elaborating the ideas which it has received from God, and seeing them all in the fundamental intuition of the "I" in the "*cogito*," and of God. This not only opened the door to the later ontologism of Malebranche and, through the appeal to the veracity of God and the denial of the power of the senses to reveal the existence of things to us, to the later scepticism of Sanchez, Bayle, Hume and the Encyclopedists; above all, it led to that absolute idealism which is so prevalent today. By confining knowledge to the strictly immanent sphere of the mind, by making the idea the term of knowledge (a theory that had already appeared in Occam and Pereira), and by reducing knowledge to the intuition of clear, evident and irreducible elements, he cuts it off from all contact with external reality, and transforms it into a merely subjective process which does not measure itself on its object, but rather measures objects by itself. Kant had only to develop this doctrine, by asserting that the understanding fashions its own object, without, however, giving it being, and that we cannot know anything but the phenomena or empirical manifestations of things in so far as they affect us. But if we cannot know the external world as it really is, only our subjective representations of it, there is no reason for affirming its existence; all that we can know with certainty is our own reality. So Fichte was at least logical in transforming the mysterious and unknowable "*ding an sich*" into the pure "I," the necessary principle of the non-ego, the phenomenal

<sup>3</sup> The fundamental position which this principle occupies in the philosophy of Descartes is well brought out by Mgr. F. Olgiati, *La Filosofia di Descartes*, Milano: "Vita e Pensiero," pp. 26-36.

world, which it produces spontaneously and unconsciously. By this pantheism he thought to solve the nature-spirit antithesis, but in reality he denied nature by reducing it to spirit. Schelling sought to unite both nature and spirit in the transcending Absolute, the common and identical ground of contraries, and of which all things are but phases or manifestations. Hegel in his turn criticized this doctrine as leaving unexplained the transition from the Absolute to the opposing poles of nature and spirit. A rational process was necessary to account for the transformation of the primary ideal ground of reality into its different modifications; and so he furnished the metaphysical frame of this universal becoming, by which the real, which is thus identified with the rational, evolves itself dialectically into all things. Thus we get the first extreme solution to the dualism of Descartes, an absolute idealism and subjective pantheism, with all its innumerable consequences in the religious, social and political orders.

A more immediate, and, in our present question, more important consequence of the Cartesian theory of knowledge is that if all knowledge is purely subjective and independent of external reality, there can be only one form of knowledge; there can be no real distinction between the sciences, and there can be but one method in acquiring knowledge. Philosophy is indeed the love of wisdom, but wisdom is the one and universal science, the total explanation of things, whether physical, mathematical or metaphysical. Beneath the apparent diversity of the sciences there lies a profound unity, for "all the sciences united together are nothing else than the human intellect, always one, always the same, however varied the subjects to which it is applied."<sup>4</sup> If science is one, there is but one universal method, essentially the same for physics, metaphysics and mathematics; and this consists in resolving, by means of the famous four rules, all knowledge into its primary constituents, the clear and evident ideas about which the mind cannot entertain any doubt. The relative or derived ideas are

<sup>4</sup> "Regulae ad Directionem Ingenii," Ia Regula (Adam et Tannery, *Oeuvres de Descartes*, Paris, L. Cerf, Vol. X, p. 360, 7-10).

to be resolved into those absolute ideas whose objects cannot be divided into a greater number of clear and simple natures. The method is hence one of decomposition of things into their absolute elements, and then a new composition of them, by combining these elements to form the relative or derived things; it is a method of intuition with regard to the clear and distinct elements, and of reasoning with regard to the composition of these elements. There is a great affinity between this and the Kantian method which transforms metaphysics into an enumeration and classification of the *a priori* elements of the mind; and such a numerical process tends to extend the mathematical method to all branches of thought.

By postulating one method for both science and philosophy, Descartes really denied the essential difference between them, and changed metaphysics into an introduction to mechanics, medicine and moral science; while the philosophy of nature became identified with the physical sciences. He thus set in motion that current of thought that was to lead logically to the position of Comte, Taine and Spencer, who asserted that philosophy is but the sum of the particular sciences in their organic connection, thus denying the reality of philosophy as a distinct science. This attitude is very common today, in practice if not in theory. It is assumed that the scientific method is the only valid approach to the interpretation of the universe, and that philosophy is only a sort of abstract physics, or, at most, a science whose duty it is to classify the different sciences, and to order systematically the data afforded by the physical sciences. It is thus made to depend entirely on the positive sciences, and is forbidden to advance any independent views on the nature of things; it may aid in forming those hypotheses by which we try to unite and explain scientific data, but this does not really add to our knowledge. Philosophy is made so dependent on the sciences that without them it has no real value, and strictly philosophical problems can be solved by an appeal to science.<sup>5</sup>

<sup>5</sup> How widespread was this conviction may be seen from the fact that our

The philosophy of the spirit, or the subjective side of the Cartesian system, is thus seen as an absolute intellectualism, a proclamation of the autonomy and absolute independence of the intellect; independence of the sensible origin of ideas, leading to an exaggerated intellectualism; independence of the object as the rule of knowledge, leading to a universal mathematicism; and independence of reality as the term of knowledge, leading to idealism. M. Maritain has well described this theory of knowledge as "angelism,"<sup>6</sup> for these are the characteristics of the knowledge proper to the angels.<sup>7</sup> But the objective side of Descartes' philosophy, his philosophy of nature, was to lead to no less direful results. Just as the essence of the soul is thought, the essence of material things is extension and movement; matter is nothing more than geometrical extension, and even the most different phenomena are but the result of changes in position and figure, and of motion.<sup>8</sup> The clear and evident elements, to which all our notions about the external world can be reduced, are extension and movement;<sup>9</sup> and so the universe is a machine, where everything is the result of figure and motion, and physics is nothing more than geometry and mechanics. This position was not only to lead to positivism, by claiming to interpret the world in terms of motion and extension alone; it also led to a completely deterministic view of nature, which is nothing less than a doctrinaire mechanism. Nothing is to be admitted unless it can be proved by reason, unless it provides complete rational satisfaction; and that which affords this rational satisfaction in the philosophy of nature is mechanism, which completely accounts for the constitution and behavior of all natural bodies, animate and inanimate, for all

universities still grant the degree of "Doctor of Philosophy" to those who have qualified in purely empirical science.

<sup>6</sup> *Trois Réformateurs: Luther, Descartes, Rousseau*, Paris, 1925, Plon-Nourrit, p. 78.

<sup>7</sup> Cf. St. Thomas, *Summa Theologica*, Ia Pars, q. 54-58.

<sup>8</sup> *Principia Philosophiae*, I, 53, 63; II, 4, 27; (Vol. VIII, p. 25, 12-27; 30, 26-31, 12; 42, 4-22; 55, 4-11).

<sup>9</sup> Cf. S. V. Keeling, "The Mechanism of Descartes," *Philosophy*, Jan., 1934, pp. 51-56.

matter may be reduced to space, and all vital activity, excluding thought, to locomotion.<sup>10</sup> This mechanism was already contained in germ in the Cartesian method; but its express formulation helped greatly in furthering the claim of positivism and mathematicism to embrace all reality within their spheres. The identification of corporeal substance with extension also marked the first step in that movement which ended in the denial of substance altogether. If the only correct and true way of knowing nature is to treat it as being composed entirely of extension and motion, the science of nature must disregard the notion of substance; and once it is granted that this science deals with everything that is real, the notion of substance is not only disregarded but rejected.

The very definition of substance which Descartes formulated led to this same result, although, strangely enough, he affirmed that substance was the only reality, in denying the reality of accidents as distinct from their subject. Accidents for him were but modes or determinations of substance in its proper line.<sup>11</sup> The affinity with Spinoza is evident. By making God the only substance and the only reality, Spinoza was but completing the work begun by the father of modern philosophy, and contributing no less effectively to banish the idea of substance from the science of finite or created being. There is also a similarity of method between these two philosophers, for Spinoza expressly applied the geometrical method to metaphysics and moral science, thus subordinating them to the mathematical study of nature. It has been well said that Spinoza stands in the same relation to Descartes as Hegel does to Kant, for he also did but draw the principles of his predecessor to their logical conclusion. But in the former case, the transition was effected mainly through the occasionalism of Malebranche. The Cartesian dualism between soul and body was developed by Geulinx into an anthropological occasionalism which naïvely regarded the soul and the body in the manner

<sup>10</sup> *Principia Philosophiae*, IV, 198, 199 (Vol. VIII, p. 321, 24-323, 14); and *Meditationes de Prima Philosophia*, 3rd Med. (Vol. VII, p. 43, 10-45, 8)

<sup>11</sup> Cf. *Principia*, I, 61-64 (VIII, 29, 16-31, 31).



of two clocks ticking in harmony; a doctrine which recalls the pre-established harmony of Leibnitz. But Malebranche extended this occasionalism to all things, making God the sole cause, and reducing creatures to the state of utter passivity, since they are but instruments and channels of the activity of God. As the concepts of cause and substance are so closely related that only a substance is a cause in the ontological sense of the word, Spinoza could claim the authority of Malebranche for his assertion that there was only one cause and one substance. The result was, of course, a universal determinism, the denial of free will, of metaphysical causality, especially of final causality, of the reality of finite substances, and hence of personality. We may thank Spinoza for showing us in advance what to expect when we apply the mathematical method to the study of all reality.

This intellectualist, or rationalist, movement on the continent, which led to pantheism and idealism, and, in Kant, to the denial of metaphysics as a science, was paralleled by the empirical movement in England, which was to lead to positivism and materialism, and to a no less complete rejection of metaphysics in favor of the empirical sciences. These two movements, so widely different in character and consequences, have a common origin; and they may best be summed up as the full flowering of the seeds of Cartesian philosophy, planted in the more speculative soil of continental thought, and in the practical and empirical soil of English thought. Modern continental thought has been described as the conclusion of a syllogism, of which Descartes formulated the major premise: "Nothing is true or real, except what is clear and evident to the mind." Kant provided the minor premise: "But only that is clear and evident to the mind which the mind produces of itself." The inevitable conclusion, "Nothing is true or real except what is produced by the mind," sums up the fundamental idea, the principle of immanence, which is at the base of modern continental idealism and pantheism. But the English philosophers, inclined by nature towards the practical and empirical, subsumed a different minor premise under the major

of Descartes; they said: "But nothing is clear and evident except what the senses tell us, and hence has reference to matter." The logical conclusion is positivism, tinged by a materialistic outlook.

Bacon had set this process in motion by his criticism of deduction as a source of knowledge, and by attempting to construct an empirical philosophy on the principles of the new scientific method, by means of induction alone. In practice this meant that philosophy comprised only logics and physics, while metaphysics, psychology and ethics were transferred to the sphere of revelation. Hobbes went a step further by applying this system to all philosophy, especially to ethics, and to politics. Reality for him was identified with what is corporeal, all activity is reduced to local motion, and substance is transformed into body. Thus philosophy is held to be the science of corporeal being, metaphysics is rejected as useless, and the sole instrument or means of knowledge becomes sensible experience and observation. Even thought is reduced to sensation, since the intellect is only the imagination using general terms; and man is disintegrated into a bundle of faculties and movements, having no substantial foundation, merely united in the "I" by a consciousness which is nothing more than sensation. There is no room, of course, for free will in this conception of man; and sensualism, with its consequent hedonism in ethics, and individualism and absolutism in politics, is at last proposed as a philosophical system in England.

If Hobbes was the moralist of the empirical school, Locke must be regarded as its representative in metaphysics. Though siding with Gassendi against the general doctrines of Descartes, and rejecting his innate ideas, his theory of knowledge has much in common with that of Descartes; but he modified it in restricting the intuition to the relations between ideas, which are only general images, and in making experience the sole fount of knowledge. He applied to the study of the mind what Bacon had laid down for the study of nature, and his contempt for deductive reasoning is well in the line of the Baconian tradition. It followed that we cannot know the essences of things,

and that the so-called secondary qualities are altogether subjective; we can only know the primary qualities, such as extension, bulk, figure and motion, and our notion of substance is entirely subjective, since it is a collection of images of those qualities which are always found united. This sensualism is the logical premise of the later materialism advanced by Voltaire and the Encyclopedists, by Condillac and Comte; but later English philosophy stands, like Locke himself, rather undecided between spiritualism and materialism. It refused to be either fully spiritualistic or fully materialistic, and preferred to guard an attitude of aloof reserve, if we except the extremes marked by Berkeley, on the one hand, and by such convinced materialists as Priestley and Toland on the other.

To Locke also is due that critical aspect which appeared in English philosophy, since he inquired into the powers of knowing and the conditions of certitude; and this attitude was to exercise, through Hume, a great influence on Kant. But if we call in question the objective existence of the secondary qualities, we should logically deny that of the primary qualities, since our perception of both pertains mainly to the senses. So Berkeley put forward the opinion that both were purely subjective; and since they comprise the sum total of corporeal reality in the positivistic and Cartesian systems, he maintained that external nature existed only in so far as it was perceived by the mind. All reality is produced by the soul, whether this soul is that of man or that supreme soul that we call God; the real world is the world of mind-images produced in us by God, and the world of our representations of things is only an ideal and subjective world. The only true substance is ideal, or rather, it is either God or the soul; that which we call substance is merely a subjective representation, which has no reality outside the mind in which it is conceived. Berkeley thus showed how close is the affinity between empiricism and the subjectivism of Kant. The denial of the reality of substance as distinct from its sensible accidents, on the ground that the mind cannot pierce beyond and beneath such accidents, if it does

not lead to scepticism, will naturally carry us into either subjectivism or pantheism.

In Hume we see the principles of empiricism carried to such logical conclusions. He reduced the internal experience admitted by Locke to external sensations and looked upon ideas as especially lively images, whose function it is to unite and separate the materials furnished by experience. No wonder that this doctrine aroused Kant from his dogmatic slumber, and suggested to him his concept of the pure *a priori* reason, which was to result in a scepticism as devastating as that of Hume. This empiricism was logical in denying causality, for observation, the only source of knowledge, cannot reveal more than an empirical succession and co-existence of phenomena, and only a substance can be a cause. The denial of the reality of substance also premised the denial of metaphysics as a science of being, the denial of free will, and the denial of the human personality as a substantial principle of man's being and activity. We are presented with the doctrine that the mind is a succession or a stream of perceptions somehow floating about and united in the void that we call man; nothing is left of objective reality but the phenomena that can be known by the senses. This is pure pan-phenomenalism.

This concept of man found an echo on the continent in Condillac, who taught that all psychic activity is but a form of sensation, and that the ego is a collection of sensations which are present to the consciousness, either as now affecting us, or as recalled by memory. The voice of common sense was lifted in Scotland in protest against these extreme exaggerations, but the current was too strong to be stemmed. Hamilton proposed this doctrine again, by asserting that the ego is but a collection of states of which one is conscious.

From this time onward metaphysics is definitely abandoned as a science, or is confused with the critical study of the value and conditions of knowledge. Cosmology, or the philosophy of nature, is identified with the physical sciences. Logic is being gradually transformed into pure mathematics, and ethics is considered as pertaining to religion or mysticism, if it is not

subordinated to the sociological sciences. All that is left of philosophy is an empirical and denuded psychology, which may admit the existence of a mind, but then only as the theater of of certain operations. More generally, however, conscious life is entirely neglected in this study, and the theme of psychology has become the sensitive and vegetative side of man. This movement is praiseworthy in that it brought to light many elements of empirical psychology which had hitherto been more or less neglected; but from the beginning it was tainted with positivism, and gradually led to identifying psychology with biology, physiology and sociology. The modern psychologists are interested only in reflexes, behavior, conduct, and the measurable correlations between the different forms of spontaneity and reaction. This is due to a large extent to Herbart and the English school, who treat of vital activity as a mathematical associationism of sensations. Psychology has thus become purely external; the psychology without a soul of Ribot has given way to a psychology without consciousness, where all the attention is turned to the exterior aspect of man. Many theories now in favor are frankly sensualistic, such as behaviorism and parallelism, which see no real distinction between mental activity and cerebral physiology; while Spencer tried to give the scientific doctrine of evolutionism a philosophical signification by applying it to the psychic life. When philosophy has been reduced to such meager and rudimentary proportions, and linked up intimately with the physical sciences, the field is free for the positive sciences to claim the sole right to interpret reality and to discover the nature of the universe. The application to philosophy of the mathematical method by Descartes, and of the inductive method by Bacon, has led to this positivistic attitude. Among many scientists today it is a firm conviction that the only real knowledge or science is that which proceeds by observation, classification and analysis of particular sensible facts, and by determining, through induction, the laws which unite sensible phenomena. We can only show how unfounded is this opinion by examining the nature of sci-



ence in general, and setting forth the general relations between the positive sciences and philosophy.<sup>12</sup>

The confusion that reigns in the world of science today is the price the moderns are paying for the rejection of metaphysics, the only science which can unify the sphere of knowledge and classify all the sciences according to their proper objects and methods. Once this unifying principle of all thought was abandoned, the world of science was split into several independent and water-tight compartments having no contact with each other and having no means of coordinating their findings in order to see their full significance and their repercussions in other branches of thought. Thus the way was prepared for any one particular science to claim the supreme position in the hierarchy of knowledge and the last word about the nature of the physical universe.

This is precisely what has happened. We are now confronted with two great movements, positivism and mathematicism, in which the empirical sciences and mathematics respectively have put forward their claims to be supreme and to have the whole of reality as their object. Metaphysics is, as it were, the governing political power in the scientific state; it was the object of attack by its subordinates, and when it was overthrown the result was, as usual, a civil war between the rival scientific factions themselves. The fundamental points of positivism have been well summed up by Dr. Fulton Sheen<sup>13</sup> under the following four headings: 1) The experimental method is the only valid and scientific one; 2) Its object embraces the totality of accessible truths; 3) The concrete is the sole

<sup>12</sup> If we have insisted, in this brief historical summary, on the gradual elimination of the notion of substance, and therefore of cause and free will, it is because these notions are intimately connected with our present problem; for the denial of substance and causality means that nothing is real except the sensible qualities, extension and movement; and since the positive sciences deal expressly with these, the way was prepared for the complete domination of thought by the mathematico-physical sciences of today.

<sup>13</sup> *The Philosophy of Science*, Milwaukee, 1934, The Bruce Publishing Co., p. 17. As representatives of this school he quotes Dr. D'Abro, of Yale, *The Evolution of Scientific Thought from Newton to Einstein*, and B. Russell, *The Scientific Outlook*.

form of reality, hence every kind of knowledge that departs from empirical data has no objective value; 4) Experience is the only reason that can justify the adherence of the mind to any truth. With the amazing rise of the mathematical sciences, this positivistic view was, in many instances, either rejected or modified, and we are now witnessing the apotheosis of mathematics in the claim of the mathematicians to be the only accredited guides in the explanation of the nature of the physical world. The mathematical philosophy of science is summed up by Dr. Sheen<sup>14</sup> as that doctrine which holds that nature is composed of those ideal forms of reason which constitute the object of mathematics. Philosophy is denied any certitude of its own, only that which comes from facts, or mathematics applied to facts. It is only a synthesis of the sciences expressing a personal attitude towards life, a sort of mysticism allied to a metaphysical vision of the world.<sup>15</sup> By applying mathematical principles to the explanation of the physical world, the comparatively new science of mathematical-physics was created, and its theoretical physics is frequently regarded as the last word of reason about reality. Its philosophy of science, among its most extreme advocates, is a combination of positivism and mathematicism.

Underlying this positivistic, and, to a lesser extent, the mathematical philosophy of science, we can detect a group of pre-scientific prejudices, such as the denial of the reality of substance and of the intelligible essence of things, and the denial of the distinction between the intellect and the senses. That the intellect is essentially distinct from the senses will be readily admitted by most human beings, for it is quite evident that there is some essential distinction between man and the other animals.<sup>16</sup> There are many proofs that the intellect is an

<sup>14</sup> *Ibid.*, p. 18. As representatives, he quotes Sullivan, *The Basis of Modern Science*; Eddington, *The Nature of the Physical World* (but we do not think that this is quite just, as we hope to show later on in this article); and Jeans, *The Mysterious Universe*.

<sup>15</sup> Cf. Sir A. Eddington, *The Nature of the Physical World*, chap. 15.

<sup>16</sup> Dr. Arnold Gehlen (*Der Mensch: seine Natur und seine Stellung in der Welt*,

immaterial faculty, while the senses are material, but we do not propose to enumerate them here, as they may be found in numerous philosophical works and nothing is to be gained by beating a dead horse. It is legitimate, even necessary, that the scientist proceed as if there were no intellectual beings and admit only what can be observed by the senses; for the particular sciences deal with the sensible phenomena alone, and their method is one of induction and observation, or, in natural history, of enumeration and classification. Experience is the sole guide for the scientist, and observation is the gateway through which scientific data must pass to be incorporated into the body of science.<sup>17</sup> But to exalt this methodological principle into a doctrinal one, by asserting that all reality is narrowed down to that particular region that can be perceived by the senses, is quite unjustifiable and amounts to denying the possibility of all science.

The very first requisite of science is that it be intellectual, if not in its method at least in its formal constituents; we should certainly be very much surprised to see an assembly of cows, or even apes, gathered together to discuss the latest developments of the quantum theory. This does not mean that all knowledge is intellectual, for brute animals possess real knowledge, though merely sensible; but that organized form of knowledge which we call science is made up of conclusions arrived at by the intellect from the observation of reality and by deduction from first principles, and hence necessarily postulates a rational faculty (except in purely spiritual beings, who, by intuition, see the conclusions in the principles without having to deduce them) and can only pertain to man, in so far as he is gifted with intellectual powers. Science is hence primarily intellectual and therefore speculative, and the practical sciences are only

Berlin, 1940, Part I) shows that even in his embryonic stages man is anatomically and physiologically different from and superior to even the highest animals.

<sup>17</sup> Cf. Sir Arthur Eddington, *The Philosophy of Physical Science*, London, 1939, Cambridge University Press, Chapter I, especially p. 10: "Every item of physical knowledge must therefore be an assertion of what has been or would be the result of carrying out a specified observational procedure."

analogically so called, and are more correctly termed arts. All knowledge is an immanent activity; and science, being the most perfect form of knowledge,<sup>18</sup> is necessarily immanent, a perfection of the intellect. As such it must be proportionate to the nature of the intellect, that is, immaterial and spiritual, and must have reference primarily to an intelligible object. Only such an object can insure that necessity and universality which true science postulates, and only the spiritual intellect can guarantee the participation of science in such essential objective characteristics. Hence any doctrine that denies the existence of supra-sensible knowledge and supra-sensible realities by that very fact teaches that all science is impossible. The principle of causality, which is the only stable basis of induction, falls to the ground; our knowledge is limited to the study of contingent beings as such, and can never attain the necessity and universality which science demands. Kant has shown that sensible experience, of itself, can never reveal such necessity and universality.

I do not think that it has ever been seriously denied that science must have this character of universality, even in the particular sciences. The botanist does not build up a science about this particular flower which he is examining under his microscope, but on the enduring characteristics of this type of flower, and its permanent place among the classified forms of plant life; nor is the doctor concerned with the particular qualities of the body which he is dissecting, except in so far as they lead him to knowledge of the human body in general. But the problem of explaining how science attains this universality has always agitated the human mind, since Plato postulated the existence of the world of ideal and subsisting forms, until our own day. Such universality must not be merely subjective, for, if the object of science is mutable and can change into something else, we cannot build up a secure and certain form of knowledge about it. The individual, as such, is mutable,

<sup>18</sup> For the moment, we do not distinguish between science and wisdom, but include both under the generic term "science."

and therefore cannot form the object of real science; and the world in which we live is composed of individual and contingent things. It is this aspect of mutability which has most impressed many minds, from Heraclitus to Bergson, and has led to varying forms of scepticism. But the world is not altogether contingent, for what is mutable supposes that which endures, since a thing must *be* before it can change; and it is this element alone, some intrinsic necessity in the inmost constitution of beings, that can render science possible. This element is what we call the nature or essence of beings, that substantial principle which gives a thing a definite place in the hierarchy of being, which differentiates it from all other beings as regards its specific properties, and which underlies the sensible phenomena by which it manifests its nature and can therefore be known. It is an indivisible ontological entity, which cannot be known directly by empirical observation. Although it is unknown to the experimental sciences, it is far more real than the sensible properties with which these sciences deal. It is the reason for those stable relations which the sciences seek to discover among the sensible manifestations of things, and the ultimate ground of the constancy of certain operations under definite conditions.<sup>19</sup>

Considered in its individual and particular existence in the world of external reality, the essence is indeed singular, and cannot form the object of science; but when it is spiritualized in that vital act of intentional union and psychical identification which we call knowledge, it acquires a manner of existence corresponding to that of the intellect, for a thing as known in the concept has the very same existence as the act itself by which it is known. The intellect, when informed by the intelligible likeness of the object, becomes the object known, in a psychical assimilation and conformation. By means of the concept, the object known can thus participate in the uni-

<sup>19</sup> In this respect, Bergson is right in saying that experimental science cannot penetrate to the real nature of things, and that this can only be done by intuition, which, for him, is philosophical knowledge; cf. "*La Pensée et le Mouvant*," ch. 6, *Introduction à la Métaphysique*, Paris, 1934, Alcan, 4th ed., pp. 201 sqq.



versality of the intellect; purified from all the individuating notes which determine it in its concrete existence in reality, the abstracted essence, or immaterialized nature (the metaphysical universal of the Scholastics) becomes capable of being predicated of the many particular objects in which it is found, and so it is fundamentally universal. When it is actually considered by the mind as being found in these particular objects, and actually referred to them, it acquires that form of universality (formal or logical universality) which only the intellect can confer. The abstract nature to which the intellect gives this form of universality is no mere subjective fiction, but the ideal representation of that which exists independently of the mind, the intelligible counterpart of the object known, and that by which the object becomes present to the intellect. The nature that is known exists actually in the physical world, but is singularized by its concrete and determined existence, if not by matter, and so is only fundamentally, or, as others would say, potentially, universal. By being rendered actually universal, the specific notes of the essence are not altered; the form of universality which it receives is a purely logical relation, and the change is in relation to the manner of existing, and hence of predicating. The nature receives a higher, intentional, existence, the existence proper to objects as known; and since existence is not an essential attribute of finite things, the essence is unaltered in its constituent notes. This must not be interpreted as the phenomenologism of Husserl, which eliminates existence from philosophy. We can admit that philosophy is not concerned directly with the particular existence of each individual object—that is why it is eternally true—but it is very much concerned with existence as such, and its function in reality. But since it is really distinct from the essence, the existence may be changed without a corresponding change in the essence; so that the universal concept of the essence leads the intellect to the true knowledge of its object and at the same time affords that universality which is necessary for science.

The universal concept, distinct from the subsisting forms of Plato, is no less distinct from the generic image, with which it is confused by the positivists, and more recently by Bergson,<sup>20</sup> and which is but a vague synthesis of many individual cases or phenomena, utterly incapable of founding any true and infallible necessity. Nor does the concept deform reality, since it faithfully represents the essence, though it abstracts from the concrete existence which gives it actuality. But Bergson is right in affirming that our conceptual knowledge does not exhaust the whole of reality, and that we have to form several distinct concepts of the one undivided being in order to obtain a complete synthetic knowledge of it. The greatest philosophers have readily acknowledged the imperfection of our knowledge of the essences of things, St. Thomas even saying that "the essences of things are unknown to us."<sup>21</sup> But this refers to our knowledge of things in themselves in their ultimate specific differentiations. Since the common formal object of the intellect is being in all its universality,<sup>22</sup> everything which it knows is attained under this formal aspect, under the aspect of intelligibility. We know material objects as beings, as principles of those operations and properties which are manifested sensibly, and can be known by the imagination and the power of perception, and thus by the intellect.<sup>23</sup> Such knowledge is necessarily very universal and general; but, by reason of its very universality and its nearness to the supreme principles of thought and being, it possesses a degree of certitude superior to that of the knowledge which deals only with the sensible properties of things. Philosophy pertains to this

<sup>20</sup> Cf. *op. cit.*, pp. 202, sqq.

<sup>21</sup> *De Veritate*, 10, 1.

<sup>22</sup> Cf. *Summa Theologica*, I, 5, 2; 79, 7; 82, 4, ad 1; I-II, 94, 2; *Summa Contra Gentes*, II, 98; *De Ver.*, 2I, 4, ad 4.

<sup>23</sup> Cf. St. Thomas, *Comm. in Met.*, VII, L. 12 (Ed. Marietti, Turin, 1935, nn. 1542-1544, and especially 1552); *S. T.*, I, 18, 2; 85, 1 c. and ad 1, ad 3, ad 4; *C. G.*, I, 3; *De Ver.*, 4, 1, ad 8; 10, 1 c. and ad 6; 21, 4, ad 4; J. Maritain, *Les Degrés du Savoir*, Paris, 1932, Desclée, pp. 61-64, 347-350. Here and in succeeding footnotes, works of St. Thomas Aquinas are designated thus: *S. T.*: *Summa Theologica*; *C. G.*: *Summa Contra Gentes*; *De Ver.*: *Quaestiones Disputatae de Veritate*; *Comm. in Met.*: *Commentarium in Libros Metaphysicorum Aristotelis*.

kind of knowledge of the essences of things, and hence studies reality under the aspect of intelligibility, and, like all true science, it is primarily speculative. But the limitations of our knowledge of the essences of things must make the philosopher beware of claiming a detailed and minute knowledge of the essences of things, or of deluding himself with the hope that his science will provide him with an easy intuition into the nature of reality. Even the imperfect and general knowledge which philosophy seeks to attain can only be acquired at the cost of much labor and prolonged reasoning; and it is precisely in carrying out the detailed and experimental examination of the sensible properties of things—a task which philosophy is not equipped to undertake—that the particular sciences are of such help to the philosopher.

Intimately connected with this characteristic of science, universality, is another equally important quality without which science would be impossible, that of necessity. The conclusions of science must not only be true universally; they must also be necessary, and this necessity must be primarily objective. Necessity, however, is opposed to contingency or mutability, so that the task of finding necessity in nature is that of discovering some permanent and immobile element beneath all the flux of change which the senses manifest to us. This element must be, by definition, the essence, that substantial principle which sustains the accidents in being, and which endures while they change and pass. Individual beings are thus a composite of necessity, by reason of their essence, and of contingency, by reason of their material elements and their mutable accidents. It is the materiality of a thing which is the root of its mutability and contingency, and it is its essential properties which endure, thus guaranteeing that necessity which science requires. We must therefore distinguish between the material object of a science, the sum of the particular objects which it considers, and which are mutable, contingent, and individual, and its formal object, that aspect under which these objects are considered by science. The scientist must abstract from what is contingent and material in his object, and give heed only to

what is necessary, either to the essence itself, or to those necessary relations among the sensible phenomena which are founded on the essence. He must, of course, study the material and contingent objects of his science, but only from one particular view point, and in order to discover the implications of necessity which all contingent things contain.

In scientific knowledge, therefore, the mind must neglect (in its formal object) all that is singular and contingent, and center its attention on that which is necessary, and, therefore, to some extent separated from the cause of mobility and contingency, that is, from matter and the individuating notes to which it gives rise. This mental process is what the Scholastics called abstraction.<sup>24</sup> We obtain different formal objects according as we abstract more or less from this potential element in beings; and since the sciences, as intellectual habits, are distinguished by their formal objects, these degrees of abstraction allow us to classify the sciences in their supreme orders.<sup>25</sup> If we abstract only from the individuating notes of things, from matter in so far as it is the principle of individuation in things, we get the first great class of sciences, those which consider the world of corporeal entities, of mutable being, with all the qualities that can be experimentally known. This is the world of corporeal substances and their properties, embraced by the "physics" of the ancients, the domain of the philosophy of nature and experimental physics and natural history. A superior, because more immaterial and more abstract, degree of science is realized when we abstract from matter in so far as it is the principle of the sensible qualities of beings—"sensible matter" the ancients called it—but still regard our object as affected with matter in so far as this gives rise to quantity,

<sup>24</sup> Cf. *S. T.*, I, 85, 1 c. and ad 1, ad 3, ad 4.

<sup>25</sup> On the classification of the sciences through abstraction cf. Aristotle, *Anal. Post.*, I, c. 28 (*St. Th.*, L. 41); *Comm. in Physic.*, Bk. II, L. 3; *In Met.*, VI, L. 1; XI, L. 7; *In Boetium "De Trinitate,"* q. 5; q. 6, a. 1; *S. T.*, I, 85, 1; Cajetan and Bannez, *Comm. in S. T.*, I, 1, 3; John of St. Thomas, *Cursus Philosophicus*, Logica, II, q. 27, a. 1 (Reiser, I 818, sqq.); *Phil. Nat.*, I, q. 1, a. 2 (*R.*, II, 17 sqq.); *Cursus Theologicus*, I, Disp. 6, a. 2 (Solemes, I, 532 sqq.); Maritain, *op. cit.*, pp. 71-93.

and the properties consequent on or founded on quantity, such as number and extension. This is the world of "intelligible matter,"<sup>26</sup> the ideal world of extension and number and of pure quantity, and it forms the domain of mathematics. The object of this science cannot exist except in sensible matter, but it can be conceived without it, though not without its supporting substance.<sup>27</sup> In this domain we may distinguish, according to the degrees of terminal abstraction, the highest form of mathematics, pure mathematics (arithmetic, algebra, analytical geometry and the infinitesimal calculus), which treats of quantity itself, or magnitude, in so far as it is measurable; next come geometry and mechanics, which treat of concrete quantities of a continuous nature and the laws of distance; and finally, in applied mathematics, we see the applications of these sciences to different kinds of facts and possibilities. Supreme in the grade of natural sciences is metaphysics, whose object abstracts from all material elements, leaving only being, considered under the formal aspect of being, and its necessary properties and laws; an object which can not only be conceived without matter, but which can exist apart from matter, or is common to both material and immaterial beings alike. This is the world of being as being, and of the transcendental properties pertaining to being, such as unity, truth, goodness, substance, potency, act, causality, etc.<sup>28</sup>

We arrive at the same classification from a subjective viewpoint, namely, from the very nature of science as a process of demonstration, or syllogistic reasoning, about the facts known through experience. The first principle of each science, and the medium of its demonstration, if it is a deductive science, is the definition of its subject, for this enunciates the essential attributes of a thing, and contains implicitly all the further

<sup>26</sup> Cf. St. Thomas, *Comm. in Met.*, Bk. VII, L. 10 (n. 1496); Bk. VIII, L. 5 (n. 1760).

<sup>27</sup> Cf. St. Thomas, *In Phys.*, II, L. 3, n. 5-9; *In Met.*, Bk. III, L. 7 (n. 422); Bk. V, L. 16 (989); Bk. VII, L. 10 (n. 1496); *In Boetium*, q. 5, a. 3; *S. T.*, I, 5, 3 ad 4.

<sup>28</sup> Cf. *S. T.*, I, 85, 1 ad 2, etc.



properties which are founded on the essence.<sup>29</sup> If the definition thus holds the central place in science, it is clear that the orders of sciences will be distinguished according to the different ways in which these definitions are obtained.<sup>30</sup> We may define things in the most general terms of being, or in the more specialized terms of quantity, or again we may define them in so far as they are affected by their sensible qualities; but we cannot define the individual, because in so far as it is individual it is ineffable.<sup>31</sup> These three manners of defining things, and therefore of proceeding in the demonstrative process which constitutes science, correspond to the three great degrees of abstraction.

Bearing in mind these general characteristics of all science, we can now indicate the formal distinction between the particular sciences and philosophy. That which above all distinguishes philosophy from other kinds of science is that it is primarily concerned with the essence of things, that which is fundamentally universal, and the objective cause of the necessity which is essential to science. But we cannot be said to know the essence unless we know its causes, the influence which brought it into being, the end to which it is ordained, no less than its material elements and its specifying form. Hence philosophy is essentially the scientific knowledge of things by their causes; and it is such knowledge alone that constitutes science in its full perfection. A certain knowledge is gained by considering the effects which a thing produces, the conditions under which it operates or exists, and the phenomena

<sup>29</sup> It must not be thought that, since the definition is the principle of a science, it is the first thing known in that science. We can only arrive at the definition after a long and exhaustive process, of induction and deduction, which Aristotle significantly called the "hunt of the definition." At least a nominal definition is necessary as a starting point, but it is the aim of science to arrive at a real definition.

<sup>30</sup> Cf. St. Thomas, *In Met.*, Bk. VI, L. 1 (1156); Bk. XI, L. 7 (2256).

<sup>31</sup> A discussion of the nature of the so-called "concrete sciences," whose object is individual, such as cosmography, geography and history, should find its place here, but it is outside our present scope, since these sciences do not pretend to treat of philosophical questions.

with which it is associated; but it has not the same degree of certitude as that which is based on those necessary links which bind a thing to its four causes. Among the many causes of a being, philosophy considers only the four ontological causes; and, on account of the subordination existing between the different branches of philosophy, by which they are all dependent on metaphysics, which treats of the supreme causes of things, philosophy can be said to consider the supreme causes of its object either formally, as in metaphysics, or by participation, as in the other parts of philosophy. We can further distinguish wisdom, the highest form of knowledge, from science, in so far as wisdom is that intellectual habit by which we consider the supreme cause of all things, judge of all things in the light of this supreme cause, and order all things to it.<sup>32</sup> In the natural order, metaphysics alone is entitled to the full title of wisdom in all its formality, more especially that part of it which we call natural theology; the other branches of philosophy and the particular sciences belong formally to the realm of science, not of wisdom.

The science of mathematics does not treat formally of the essence of its subject, quantity, but is deductive in arriving at the knowledge of its properties by discursive reasoning. But the conclusions in which it formulates its findings are in the form of mathematical equations and therefore cannot express the reality of motion, for such equations are but forms of the principle of identity, where the two identical terms are differently divided; and where there is identity, there is no movement. But if mathematics must, not only by reason of its object, but also by reason of its procedure, exclude or abstract from motion, it cannot consider the efficient or final causes of things;<sup>33</sup> these pertain to the dynamic consideration of things, whereas mathematics is essentially static. Hence it cannot claim to treat its object under the aspect of all its four causes,

<sup>32</sup> Cf. *Met.*, Bk. I, cc. 1 and 2; St. Thomas, *Comm.*, L. 1 and 2; *S. T.*, I, 1, 6; I-II, 57, 2; II-II, 45, 1; *C. G.*, I, 1; II, 4; *In Boetium de Trinitate*, q. 2, a. 2 ad 1.

<sup>33</sup> Cf. *In Met.*, III, L. 4 (n. 374, 375); Bk. V, L. 16 (n. 989); *In II Phy.*, L. 3, nn. 4-7; *S. T.*, I, 5, 3, ad 4; *De Potentia*, 5, 1; *In Boetium de Trin.*, q. 6, a. 1.

and is therefore distinct from philosophy, even though it may in some way attain to the essence of this object.

If the particular sciences of the lowest degree of abstraction retain the word "cause" in their lexicon, it is given a different sense from that which it has in philosophy. These sciences may treat of the proximate constituents of their object, but they will still be distinguished from philosophy, which considers the ultimate causes of things, and for the most part they treat their object under aspects which bear only an analogical resemblance with the true causes. Nor can these sciences be said to treat of the essence of their object, their immediate object is not the essence, but the phenomena of things, and the laws which bind them together in regular succession and co-existence. Such a study is also primarily quantitative; and the "causes" of which it speaks are only the quantitative and measurable relations between such phenomena in so far as they take place in space and time. It follows that the method employed in these sciences must be above all inductive; by an analysis of the phenomena, they seek to formulate the empirical laws which rule their succession and co-existence. But the validity and necessity of these empirically determined laws can only be guaranteed by philosophy, and derive ultimately from the necessity of the essence which underlies the phenomena. Though not treating formally of this essence, the particular sciences suppose it as the foundation of the regularity which they observe among the phenomena; they accept a necessary law, determined by induction, as a practical substitute for the essence, and by thus participating in the necessity which has its root in the essence, they acquire that firmness and certitude which is essential to all science.

Whether a science be deductive or inductive, *a priori* or *a posteriori*, it must start from experience, and remain constantly in touch with the data of experience, if it is not to degenerate into pure abstractism. The ancients were most insistent on this point, asserting that all knowledge, even the highest form in metaphysics, starts from the senses, through which the intellect is brought into contact with the world of reality. It is

often said, in reproach, that the philosopher neglects the role of the senses, and gives himself over to airy speculations, without any regard to the data of experience. Such a reproach may be justified as applied to certain individual philosophers, but it betrays a lamentable ignorance if it is formulated against the accredited masters of the *philosophia perennis*. Aristotle makes experience the bedrock on which he founds his whole system, and even a most cursory reading of his works reveals that the appeal to experience was for him the beginning as well as the ultimate test of even his most abstract theories. He rejects the ideal world of Plato, teaching that the object of science pertains to the world of reality in which we live; he follows Socrates in affirming that all our knowledge starts in the senses, and thence, by reflection and abstraction, attains that universality necessary to science; and over and over again he stresses the necessity of basing our theories on facts of experience and observation,<sup>34</sup> while his works are full of observations of amazing accuracy and thoroughness, thus showing that he practised what he preached.

True, the instruments of observation in Aristotle's day were very imperfect, and the physical theories then in vogue have long since been abandoned. But this is the fault, not of the philosopher, but of his contemporary scientists, and his philosophy was not founded on the physical theories current in his time. There is an experience common to all men and ever capable of manifesting those elementary facts which suffice for the philosopher, as well in our own day as in the days of the Athenian Lyceum. We must distinguish two forms of experience: the common or vulgar form, which is essentially pragmatic and infra-scientific and which limits itself to the most common facts of nature—an experience which M. Maritain has well called "perinoetic";<sup>35</sup> and scientific experience, whether

<sup>34</sup> Cf. *De Generatione Animalium*, II, c. 7; III, c. 10; *De Generatione et Corruptione*, I, c. 2 (St. Th. L. 3, n. 8); *De Caelo et Mundo*, III, 8; *Met.*, I, c. 1. Cf. Dr. E. Zeller, *Philosophy of the Greeks*, translated into English by B. Costelloe and J. Muirhead, *Aristotle and the Earlier Peripatetics*, Vol. I, Longmans, 1897, London, pp. 259-265.

<sup>35</sup> *Les Degrés du Savoir*, pp. 400, sqq.

empirical or philosophical. The enormous progress made by the sciences as regards accuracy of observation and the perfection of their technical instruments has allowed us to discover new facts and to add to the content of our knowledge of phenomena, and has also rendered great service in purifying many of the notions of common experience from the imaginative accretions and false interpretations which had accumulated through the ages. While such scientific empirical experience seeks to discover new phenomena, philosophical experience limits itself to penetrating to the inner meaning of those notions which common experience gives to us, and which have been purified by scientific research; hence it may be called "dianoetic." In this penetration of the facts of common experience, the philosopher is independent of technical assistance, although this is a great aid and by no means to be neglected. Such penetration depends far more on the intellectual prowess of the investigator than on the number of experiments made; hence the genius of an Aristotle or an Aquinas could raise the lasting structure of his philosophical system on the basis of those facts which common experience reveals, such facts as the existence of something, of a multiplicity, of movement, quantity, extension, life, thought, desire, etc.

We are apt to exaggerate the powers of our instruments, and thus to come to despise the value of the observation of the unaided senses and to deny what they reveal, accepting only what the instruments tell us. We forget that the errors associated with sense-knowledge arise, not from the senses themselves, although their knowledge is entirely relative, but from our false interpretations of sense-data, and that any aspersions on the validity of sense knowledge fall directly on that of technical observation; for these instruments are but aids to the senses, whose power they increase in one particular direction, but whose united testimony they also divide, so that they add to the possibility of error by affording false perspectives, and by destroying the natural unity of sense-knowledge. "The method of enquiry of the physicist," says Sir A. Eddington, "depends on sharpening up our sense organs by auxiliary



apparatus of precision.”<sup>36</sup> Moreover, they can only give us average determinations, sufficient for practical purposes. We can say that “both gravitation and electric force follow approximately the law of inverse-square of the distance,”<sup>37</sup> but we are speaking approximately. Heisenberg’s principle of uncertainty has taught us that we can only hope to reach approximations as to the relative speed and position of intra-anatomical entities. Furthermore, our experiments deal with the present stage of the evolution of the universe, so that their range is very limited; only by an immense extrapolation—which we cannot justify experimentally, for we cannot observe the distant past or the remote future—do we extend our conclusions to cover the regions beyond observation. Our experiments, to accept them at their face value, only show us the way a thing is acting in this phase of the evolution of the universe, in so far as can be empirically determined; and this is the only law of nature which scientific empirical experience can make known to us.

These considerations alone should make us hesitate to accept the scientific presentation of facts as a complete and exhaustive representation of them. But two further remarks show conclusively how unfounded is the claim of the positivists that they deal with all reality and alone have the right to affirm what is or is not true. First of all, the facts with which science deals are separated from their natural environment; they are artificially torn from their place in a dynamically inter-connected universe, and thus withdrawn from the numerous influences which natural causes exercise on them. This is a legitimate method of procedure, but it distorts reality and forbids

<sup>36</sup> *The Nature of the Physical World* (Cambridge University Press, cheap edition, reprinted 1933), p. 91. Cf. P. Duhem, “The man in the street believes that the result of a scientific experiment has a higher degree of certitude than that of common experience. He is wrong, for the result of a physical experiment has not the immediate certitude of the common and non-scientific experience, and is not as easily controlled. It is less certain than common experience, but surpasses it in the number and precision of the details it makes known.” *La Théorie Physique*, 2nd ed., Paris, 1914, Rivière, pp. 246, 247.

<sup>37</sup> Eddington, *op. cit.*, p. 29.

us to claim that we know all about a thing because we have succeeded in observing it by our instruments. This becomes most evident in biology. Professor A. E. Taylor has written: "If you set out with the notion that the only methods available for the attaining of truth in all matters must be those of the experimental man of science in his laboratory, you will be forced to add not merely that all truths must be established by 'induction' from observed facts, but that the observed facts must be 'laboratory' facts, facts of the kind that lend themselves to the purposes of the man of science. And the only facts which are suitable to his purpose are facts which are not merely determinate, but quantitatively determinate in all their features, records of minute and precise measurements. Once admit about any fact whatever that it in any respect eludes the possibility of such measurement, and you have rendered it unavailable for the purposes of the laboratory. (Or, at best, what you can extract from it for those purposes is not the full fact, but a mutilated aspect of it, which excludes the features in it not amenable to measurement). And for this simple reason: no concrete fact of life is a 'laboratory' fact at all, and can only be made to appear so by the most unscrupulous 'editing.' You cannot make the facts about life and living beings fully amenable to what a naturalistic metaphysic regards as the only legitimate method for the attainment of truth, without the suppression of life itself; you must 'murder to dissect.'" <sup>38</sup>

We may also quote the remarks of Sir Oliver Lodge on those scientists who refuse to admit any fact about living beings unless it has been revealed by their instruments and who, from the fact that when the brain is damaged thought is impaired or ceases, conclude that brain and mind are identical. He says: "I urge that this does not follow at all, and that it is contrary to all analogy. A close examination of the brain will not explain thought, though it will show us the mechanism by which thought is reproduced in perceptible material form. Examination of the strings of an orchestra, or of the strings of a piano,

<sup>38</sup> "Freedom and Personality," in *Philosophy*, July 1939, pp. 264, 265.

would never yield a symphony or a sonata; and yet these instruments are necessary for its reproduction or manifestation.”<sup>39</sup> Similarly, “a seed or germinal vesicle is itself a molecular aggregate, which themselves are now known to be each a set of minute electrical particles revolving round an electrical nucleus.” In some cases, these have constituted a substance known as protoplasm, which can develop into a beautiful plant or animal; “but no examination will explain its vitality. Associated with, or incorporated in it, is something which not only enables it to build into its own structure otherwise alien material, but which exercises specific control over that material, building up a definite form and a specific type—a type which does not depend on the material, but is entirely dependent on the indwelling specific essence, of which the material is only the vehicle and demonstration.”<sup>40</sup> This immanent principle, unobservable by technical instruments, has been called by Driesch the mysterious “factor E,” a non-spatial principle, which maintains the specific type of the individual. Science must conclude: “The essence of life is beyond us; we know not whence it comes nor whither it goes. So far as we know at present, there is no life without antecedent life. . . . It is dependent on matter and physical and chemical energy for its manifestation and development; but neither matter nor energy can explain the thing itself, or give an idea of its marvelous properties.”<sup>41</sup>

Among the facts with which scientific knowledge treats, we must distinguish the pure fact, the object of pure sensation (*sensibile per se*), attained in its existence by the sensing subject, and which, of itself, has no importance for the savant; and the so-called “mixed” fact, which of itself does not affect the senses, but which is found associated with the proper object of sensation, in a synthetic acquired knowledge (*sensibile per accidens*). This association refers to the data of the different sensorial registers, to images and memories, to practical judg-

<sup>39</sup> “Life and Matter,” in the *Journal of Philosophical Studies*, Oct. 1927, p. 479.

<sup>40</sup> *Ibid.*, p. 479.

<sup>41</sup> *Ibid.*, p. 480.

ments of instinct, and also to concepts of the mind; and it is this association of a subjective element with a sense-object that allows us to speak of scientific experience. Hence a scientific fact not only establishes the existence of that which is the proper object of sensation, but also, and principally, of a reality that is thought, of an intelligible object associated to an object of sensation in the concreteness of an organized experience. Among the objective elements enunciated in a fact, it is the intelligible object whose existence is affirmed, which has the formal, specifying, and diversifying role. Thus a scientific fact is not something purely sensible, but a sense-object elaborated intellectually <sup>42</sup> and so rendered fit to be adapted into the intellectual scheme of the science to which it refers. There are, therefore, as many kinds of facts as of concepts. It follows that the facts with which the particular sciences deal cannot, of themselves, have a philosophical signification or be incorporated as they stand into a philosophical system. They cannot be invoked to solve a problem of philosophy, for they are associated to a type of concept which differs from the type of concept of philosophical thought, and are adapted for incorporation into a system whose explanation consists in a resolution, or reference, to empirical observation. To have any bearing at all on philosophy, they must undergo a change of context, they must be illuminated by philosophical knowledge, otherwise acquired, and thus given a higher intelligible context, an ontological signification, which transfers them into the domain of philosophical facts. In practice, this means that a dispute in philosophy cannot be decided by an appeal to the facts of science as these are presented in their purely scientific conceptual dress; and that philosophy transcends the particular sciences, not only as to its principles, but as regards the formal element of experience, and even as regards the material of experience, since this is provided, in common experience, anteriorly to scientific experiments. It also means that one of the

<sup>42</sup> This intellectual elaboration of sensory data, the first task of the scientist and philosopher alike, is that referred to by Helmholtz as the deciphering of sense-signs, or the interpretation of the world of sensory experience of Max Planck.

tasks of philosophy is to keep in touch with the recent developments of science, in order to discern when and how new theories may have philosophical implications, and to judge the value of such implications as are claimed for them by the scientists.<sup>43</sup>

The second remark to be made on the scope of technical observations is that they interpret in terms of quantity and motion even that limited field of reality with which they deal. A thermometer, for instance, interprets heat, a quality, in terms of the expansion and contraction of mercury, in so far as it can be quantitatively represented; and the so-called secondary qualities are explained as vibrations, in terms of motion, color, for instance, being reduced (objectively) to its scientific equivalent, electromagnetic wave-length. Motion itself is interpreted quantitatively, as the position in space, at certain moments, of the moving body. The limitations of scientific observation are well understood from the picture of the scientific observer which Sir A. Eddington has given us.<sup>44</sup> The physicist, we are told, in studying the scientific world, is deprived of all superfluous senses; he is denied the aid of taste, smell, hearing, even touch. He must have only one eye, which can discriminate two shades, so as to distinguish whether an object is absent or present. This one eye will be likely to recognize geometrical form and spatial magnitude, and hence physics, twenty years ago, was largely geometrical. In 1915, Einstein deprived our peculiar disembodied observer of the faculty of recognizing form or extension; he could now only tell whether two things were touching or not. The one sense with which the observer has been left is capable of merely quantitative impressions; he has "power to see when a pointer coincides with a gradation on a scale."<sup>45</sup>

<sup>43</sup> On the difference between scientific and philosophical facts, cf. Ives Simon, "Philosophy of Science," in the *Revue de Philosophie*, Janv.-Fév. 1935, pp. 53-64; "Les Préoccupations expérimentales des philosophes et la notion de fait philosophique," *ibid.*, Mai-Juin 1932, pp. 267-289; J. Maritain, *Les Degrés du Savoir*, pp. 102-130.

<sup>44</sup> "Physics and Philosophy," in *Philosophy*, Jan. 1933, pp. 30-43.

<sup>45</sup> *Ibid.*, p. 35.



This method of observation is rigorous and exact, in its own sphere, but it must not be pushed too far. We cannot deny the existence of a thing merely because it cannot be observed by such methods. This would be to imitate the attitude of the astronomer who denied the existence of God because he could not see Him with a telescope, or of the doctor who denied the existence of the soul because he could not discover it with his scalpel. There is also the danger of a vicious circle in depriving the scientist of the faculty of distinguishing colors, and then denying the existence of color altogether because he does not perceive it. Our instruments have sharpened up certain of our senses, but they have excluded many others from the scene, and have thus restricted our view of reality to one very narrow aspect. All the senses can cooperate to present a more perfect and complete picture of reality to the intellect, which can then penetrate to the inmost constitution of things, since it sees things under the aspect of intelligibility, and can arrive at deductive knowledge of objects made known by experience and thus attain to such truths as can never be learned from mere technical observation. The purely positivistic attitude is now disappearing, but it has left many traces. Many men of science are to some degree affected with its teaching, and will but reluctantly admit the existence of things which do not come under the range of their instruments, or persist in trying to explain them by methods wholly unsuited to the task.

It is an attitude which, if adhered to strictly, will have disastrous consequences for science itself. The intellect itself cannot be observed by our instruments; but if we deny its existence, we cut at the root of scientific knowledge. Causality is equally unobservable, and it is now called in doubt by the physical indeterminists. Once it is denied, however, what right have we to assert the existence of the entities with which science deals, for instance of protons and electrons, except that the hypothesis of their existence gives us a basis for introducing order among our data and promoting discovery? Such hypotheses are legitimate in science, but we cannot infer the reality of the entities they are intended to explain unless we

postulate them as the cause of certain sense data; and this inference is invalid, once causality has been rejected, so that the whole "scientific world" itself is reduced to a subjective representation, to mere "mind-spinning."

If the scientific description of the world were the only true one, we should be in a very confused state of ignorance indeed. We are confronted with two theories as to the nature of light, and we are told that they are contradictory. It seems that the electron itself has both the particle and wave properties, so that it is now called a "wavicle" possessing seemingly contradictory properties. The Rutherford-Bohr atom has now given way to that of Schrödinger, and it is to be regarded as a wave-center of the probability entity  $\psi$ ; and goodness only knows how many new theories are yet to be advanced.<sup>46</sup> E. Picard sums up the present position when he says: "Some [physicists] ask whether the electron has only a purely analytical existence, being but a center of vibration in a system of waves which alone are real. For others, it is the waves which have only an analytical existence."<sup>47</sup> This serves to show that physical science is not directly concerned with the reality of the physical world, but only with certain quantitative and measurable aspects of it, in so far as these can be expressed in convenient mathematical formulae. As W. T. Stace says: "The relation of atoms to sense data is not the relation of cause and effect, but the relation of a mathematical formula to the facts and happenings which it enables the mathematician to calculate."<sup>48</sup> At least, this is all he is entitled to conclude on the positivistic hypothesis, although a sane philosophy can come to his aid and point out the epistemological value of his conclusions, and provide an ontological basis for his science and his observations. To refer to the now famous example of Sir A. Edding-

<sup>46</sup> Heisenberg's new quantum theory (1925) was followed, in the space of twelve months, by at least three different interpretations of it, those of Born and Jordan, of Dirac and of Schrödinger.

<sup>47</sup> *Un coup d'oeil sur l'Histoire des Sciences et des Théories Physiques*, Paris, 1929, Gauthier-Villats, p. 44.

<sup>48</sup> "Sir A. Eddington and the Physical World," *Philosophy*, Jan. 1934, p. 48.

ton,<sup>49</sup> the physicist may see in the elephant which slides down a grassy slope only a "bundle of pointer-readings," indicating the bulk of the animal, the angle of the slope, the readings of a photometer, etc., for he is not in the least concerned with the reality or inner nature of that curious quadruped with a trunk and tusks of ivory. He would have arrived at the same result had some other object of the same mass, color and shape slid down the same slope (provided the elephant submitted to the experiment with complete passivity). But we should lift our eyebrows if he were to state that the elephant had no objective reality, because he was not concerned with it, or because his numbers and measurements remained the same whatever the object in question. He would, however, probably lift his hands in horror if we were to deny the objectivity of electrons and protons; for these leave traces (a wavy line on a photographic plate) and can be weighed and measured. Yes, indeed; but if this is the test of reality, why deny the reality of the elephant? He also can leave traces, not only on a photographic plate but on any other sort of plate, and he can, much more easily, be weighed and measured. One result is provided by common experience, the other by scientific experience; and the discrimination between the two can only be explained by the disdain of common experience in favor of the latter, and an exaggerated opinion of the scope of the sciences.

Such an attitude is, to some extent, inevitable, owing to the specialization imposed by the tremendous advances of physical science. "The specialist, in every department of life," remarks Mr. Noyes,<sup>50</sup> "has been very well defined as a man who knows more and more about less and less. It is a plain fact that, in our rapidly growing world, the extension of various kinds of highly specialized knowledge, all valuable in their own way, has given us so many things to look at, that we are not only blind to the woods, but have almost ceased to believe in the trees."<sup>51</sup> Since each branch of science has its own method, the

<sup>49</sup> *The Nature of the Physical World*, pp. 251, sqq.

<sup>50</sup> *The Unknown God*, London, 1934, Sheed and Ward, pp. 10, 11.

<sup>51</sup> This passage continues: "We have evolved a race of specialists, each working

specialist, by long application, acquires a habit, conformable to his manner of investigation and explanation; and habits become second nature with us. This results in a restriction of the plasticity of the mind, and a tendency to apply one particular method to the solution of all problems. Such a procedure spells disaster and ruin. It explains why those who are experts in their own branch talk utter piffle when they come to treat of other problems.<sup>52</sup> The specialist can claim no more authority in another branch of knowledge than any other ordinarily educated man. In fact, he is much more liable to err than his non-specialist companion, since he is led by inclination and habit to judge of all things by his particular method and set of principles, whereas the non-specialist relies on those general principles and common-sense notions which nature has implanted in us. These principles are of far more universal value than the particular principles of the specialist in correlating the facts brought to light by the different sciences and in judging of their relative importance and significance. As a practical consequence, we may note that "controversies arise not so much from real disagreement as from misunderstanding the real beliefs of others and the terms in which they are expressed, or from a limitation of the intellectual vision, whereby the specialist sees with great sharpness every detail of a certain

along his own narrowing line, each developing a language of his own, and each diverging further and further from that central point of view which once enabled us (from the lost height of a great historic religion) to 'see life steadily and see it whole.' With the very best intentions, and in a most orderly and scientific manner, we have built an immense Tower of Babel, and we have been gradually overcome by the ancient penalty—a confusion of tongues."

<sup>52</sup> Dr. Robert Hutchins, president of the University of Chicago, writes: "You will have noticed, too, that it has become almost a tradition in this country for a natural scientist, after he achieves eminence and leisure, to employ some of both in metaphysical, and even theological, speculations. Without any particular training in these disciplines, and with a healthy contempt for those who have, he proceeds to confuse the public further about the greatest questions that have confronted the human mind." He adds: "The reception accorded the expressions of these gentlemen shows how much we feel the need of an orthodox theology or a systematic metaphysics." *The Higher Learning in America*, 4th printing, New Haven, 1930, Yale Univ. Press, p. 104.

restricted field, but is unable to coordinate his views with other and not less important aspects of the matter. Even though others may also be right, he denies their rightness simply because he is looking in another direction. It is for this reason that the affirmations of men of science are far more to be trusted than their denials."<sup>53</sup>

This narrowing of the mental vision is common to all science, and demands, in compensation, that the scientist should be possessed of a certain general culture (as distinct from mere dilettantism and "dictionarism," which are entirely superficial) which may restore the balance and harmony that the exigencies of the scientific method have destroyed, by developing those powers which have been atrophied by neglect. That is why culture is broad and universal, transcending the narrow divisions and limited visions of specialism; it is the perfection of man as man, as distinct from the cultivation of one side of our nature to the detriment of the others. Father Sertillanges has written some appropriate words on this subject. He says: "Every science, cultivated apart, not only does not suffice, but is attended by certain dangers. Isolated mathematics falsify the judgment, by habituating it to a rigor which no other science, and still less real life, can suffer. Physics and chemistry beset us with their complexity, and narrow the spirit. Physiology inclines one to materialism, astronomy to divination, geology turns one into a bloodhound on the scent, literature empties one, philosophy puffs up, and theology leads to sham sublimity and doctoral pride. We must pass from one mentality to the other in order to correct them, one by the other; we must rotate the crops if we would not ruin the soil."<sup>54</sup>

If we do not counteract the dangers of specialism, we are condemning ourselves to a life that is not fully human and putting ourselves in the way of temptation, that of belittling the value, or denying the objects, of other sciences, and of closing our eyes to whole realms of reality and truth. The physi-

<sup>53</sup> Noyes, *op. cit.*, p. 114.

<sup>54</sup> P. Sertillanges, O.P., *La Vie Intellectuelle*, (Éd. de la Revue des Jeunes), Paris, Desclée, New Edition, 1934, p. 117.



cist has dissolved the world into "tiny specks floating in the void";<sup>55</sup> and for the "familiar table" he has substituted the "scientific table" of electric charges scattered throughout empty space. Very good; but if we admit the claim of the physicist that the "scientific" table is the only real one, we are surrendering the whole universe, under all its aspects, to one specialized branch of thought. The physicist, in this case, would also tell us that the human countenance was only a constellation of electric forces, and he would have truly analyzed one side of the picture. But what has become of the smile on that face, or the affection that shines through those eyes, and the other realities of higher order that it expresses? Or, if the chemist gives us an acute analysis of the reactions involved, will he have told us the real meaning of the heaving of the breast of our beloved? He may present us with an exquisitely accurate analysis of the water and salt in human tears, but will that tell us what they mean? Surely we are dealing with different orders of truth, "as different as that of an electron from that of a flower," and with realities which "are expressed in languages as different as an architect's blueprint from a picture by Turner."<sup>56</sup> Specialism can thus lead to encroachments on other spheres, and this to the elimination from the universe of all its highest values.

This confirms what we have already said, that man can know much more than what his instruments reveal to him. The mother knows far more about the real significance of the light in the eyes of her child than can be learned from a physical analysis of those eyes into a system of infinitesimal planetary worlds. The scientific picture is true as far as it goes, but the scientist, attuned by long research to consider only the quantitative aspect of things, may find himself unable to appreciate the other aspects of things. This "maladjustment" of the intellectual focus may be so permanent as to lead the scientist to deny the reality of those things such as justice, mercy, friendship, freedom or thought, of which his

<sup>55</sup> Eddington, *The Nature of the Physical World*, p. 1.

<sup>56</sup> Noyes, *op. cit.*, p. 187.

science does not treat and which do not pertain to the "scientific world." In such cases, the denials of the men of science are indeed not to be trusted. The recognition of such realities demands a deliberate alteration of the intellectual focus,<sup>57</sup> and the inability of the scientist to make such an alteration should not be construed as a sweeping generalization about objective reality.

From a subjective point of view, then, the need is felt for a science which may recapture the power of direct vision, by coordinating all the partial views afforded by the various branches of knowledge into one unified vision, the vision of the whole man, not of the specialist or of the disembodied and one-eyed observer of science. This higher science, the science of man brought face to face with nature and moved by wonder to seek the causes and nature of things, is the philosophy of nature, one of whose tasks it is to reintegrate into one comprehensive view our scattered fragments of knowledge, and thus to regain the central point of view which necessarily eludes the specialist in physical science. To this subjective need corresponds an objective reason for the philosophy of nature. The special sciences "pulverize" nature and divide it into several water-tight compartments, and their facts are separated from their natural environment. Philosophy must consider nature as a whole, thus restoring that unity which specialism has destroyed.

Comparing the philosophy of nature with the physical sciences, we may say, in general, that the former is deductive, while the latter are mainly inductive. The material object of both is the same, the material universe and its constituent parts. But philosophy considers it primarily under the aspect of intelligibility; it treats of sensible and mutable being, but under the aspect of being, by seeking to know the essences of things by their causes. Hence it has a certain affinity with metaphysics, and is of little or no value in extending our knowledge of phenomena. The philosopher is concerned with pene-

<sup>57</sup> Cf. *ibid.*, pp. 190, 339; cf. also pp. 76, 195, 196.

trating to the inner meaning of the notions of common experience and formulating the universal truths which they imply. He must start with experience, and hence must proceed analytically; but he aims at a synthesis, by which he can correlate all his subject to the universal laws of being and thought and discover the intelligible and necessary relations which link together the various parts of the universe. This is only possible once he has succeeded in defining the entities with which he deals; from these definitions he can arrive at the knowledge of many properties of things by way of deduction. We may, under certain conditions, find out, by observation and experiment, that two notions are always connected; but the intellect can, with far greater certitude, discover the logical or essential connections between two notions by analyzing and comparing them. The difference between scientific and philosophical analysis is that the philosopher analyzes the essence of things, expressed in the definition, and so arrives at the ontological relations between things; whereas the scientist analyzes things from a material or phenomenal point of view, and so can learn only the relations between the phenomenal manifestations of beings.

The difference in method leads to a difference in the manner of explanation. The philosophy of nature reduces its objects, by deduction, to the intelligible sphere of being, distinguishing what is necessary, contingent or fortuitous in the world. The physical sciences, depending mainly on induction, establish their concepts by reference to what is sensible and observable. They are sciences of phenomena, rather than of being, and hence they are not explicative in the causal sense of the word,<sup>58</sup> for they do not treat of the ontological causes of things. Their explanations are hypotheses, which seek to relate facts to an unknown condition, to reduce the unknown to something describable in terms of familiar conceptions, and hence cannot be said to explain these facts by their causes. Such hypotheses

<sup>58</sup> Cf. W. T. Stace, *loc. cit.*, p. 47: "Scientific laws, properly formulated, never 'explain' anything. They merely state, in an abbreviated and generalized form, what happens."

are rather subjective aids which satisfy our natural inclination to know the causes of things, and which present us with a handy formula which helps us to introduce order among our observed facts and aids the memory by reducing complexities to some form of synthesis. This manner of explanation differs essentially from that used in philosophy, both in method and in the object it defines. They concern different aspects of reality, so that there can be no collision or contradiction between them. The two branches of knowledge differ as much as ontological definition and analysis differ from empirical observation and description. Any seeming contradiction is due to an unwarranted excursion of either the philosopher or the scientist into domains beyond his scope, where his particular methods are entirely unsuited to the aspect of reality which is there considered. An attitude of mutual understanding and aid should reign between the two forms of science, especially since they both treat of the same material objects. And if the scientist renders great service to the philosopher by purifying the notions of common experiences and discovering new phenomena, he, in turn, is aided by the philosopher, who furnishes the ontological basis of his science, and defines and defends those fundamental notions (such as quantity, space, time, place, life, thought, etc.), which the scientist supposes but with whose inner reality he is not concerned.<sup>59</sup>

The errors of a universal mathematicism can only be refuted by recalling briefly the chief notes of this science of the second degree of abstraction. As we have already said, it considers formally only quantity, and under the aspect of measurability, not under the aspect of being. Quantity is a real accident, existing in the objective world, so that mathematics depends on experience for its object. But it is considered so abstractly that it prescind from all existence, whether real or merely rational. It is refashioned independently of experience and treated as if it were something subsistent, and often acquires

<sup>59</sup> For a more complete discussion of these points, cf. J. Maritain, *Science et Sagesse*, Paris, 1935, Labergerie, ch. 2; *Les Degrés du Savoir*, ch. 2.

an imaginary character which has no counterpart in reality. Thus the imagination plays a big part in providing the object of this science.<sup>60</sup> Though presupposing the external senses, mathematics is independent of them and is free from those conditions of relativity which characterize sensation; it seeks to represent quantity by symbols in the imagination, and the real properties of this accident are translated into symbolic terms which render them convenient for numerical manipulation. Mathematics then seeks to relate these imaginative forms by means of equations, and so to construct, deductively, a network of mathematical relations between those beings which can be measured, thus building up a metrical and hypothetical representation of the universe. Its criterion is the possibility of representing things metrically and of verifying its conclusions by reference, direct or analogical, to the imagination, in which the first elements of mathematics were primarily elaborated. The sole preoccupation of the mathematician is that the numerical results he obtains by thus correlating his symbols should correspond to the measurements recorded by his instruments.

On account of its imaginative character and its process of mentally combining symbols without reference to reality, mathematics constructs many notions which have no objective counterpart (such as the "irrationals" of Meyerson, imaginary numbers, etc.), but which are necessary to mathematical procedure. These are known to the philosopher as "beings of reason," entities which have no objective existence apart from the mind. Hence the mathematical representation of the world is incomplete in that it introduces many elements which are not, and cannot be, real components of the physical world. It is also incomplete in that it represents only one aspect of the universe, since it considers only quantity, and that in so far as it can be measured. The essences of things, causality, motion or the sensible qualities find no place in the mathematical world, which is completely static, a world of numbers and

<sup>60</sup> Cf. St. Th., *Comm. in Met.*, Bk. VII, L. 10 (n. 1494, 1495).



symbols. It is hard to see how anyone could mistake this imaginative world for the real world, or believe that a mathematical equation could fully reveal the nature of things to us. Sir James Jeans, however, makes this claim, saying: "The same concept [viz.: the concept of the universe as a world of pure thought] implies, of course, that the final truth about a phenomenon resides in the mathematical description of it; so long as there is no imperfection in this, our knowledge of the phenomenon is complete."<sup>61</sup> And again: "It is true, in a sense somewhat different from that intended by Galileo, that 'Nature's great book is written in mathematical language.' So true it is, that no one except a mathematician need ever hope fully to understand those branches of science which try to unravel the fundamental nature of the universe."<sup>62</sup> There might be some truth in this claim, in the Cartesian hypothesis of the identity of substance and extension—a hypothesis still lingering on among many scientists<sup>63</sup>—or for the positivists, for whom nothing is real except what can be observed and measured. There is little difference between denying the existence of substance because it cannot be measured, and identifying it with extension. St. Thomas, following Aristotle, has conclusively shown that the identification of substance with extension is nothing more than the denial of the reality of

<sup>61</sup> *The Mysterious Universe*, Cambridge Univ. Press, 1931, pp. 140, 141.

<sup>62</sup> *Ibid.*, pp. 127, 128. We leave it to the reader to judge whether he is consistent when he says (*ibid.*, p. 142): "A mathematical formula can never tell us what a thing is, but only how it behaves; it can only specify an object through its properties." The inconsistency disappears, perhaps, if we grant the author's thesis, that the universe is a thought-structure, emanating from the mathematical creator, and can be understood only by a mathematician, in much the same way as mathematical procedure or reasoning is intelligible only to a mathematician.

<sup>63</sup> Sir A. Eddington, for instance, conceives substance as "the kind of nature exemplified by an ordinary table" (*op. cit.*, p. xi), "thinly scattered in specks in a region mostly empty" (p. xiii), "whose intrinsic nature is to occupy space" (p. xiv), "rigged out with the attributes of form, color, hardness, etc., which appeal to our several senses" (p. 273). Then, having rejected this half-vulgar, half-Cartesian entity, he claims: "We have dismissed the *metaphysical* conception of substance!" (p. 261). A similar conception of substance is entertained by Sir James Jeans, *The Mysterious Universe*, pp. 138, 139.

substance.<sup>64</sup> He also points out that this error arises from a failure to distinguish between body as it pertains to the genus of substance (a composite essence, material but not sensible) and as it pertains to the genus of quantity (an accidental form, giving this essence extension in space and the ordered plurality of parts); just as the error of the Pythagoreans and Platonists arose from confusing that unity which is convertible with being with the unity which is the principle of number.<sup>65</sup>

This Pythagorizing tendency may, perhaps, be explained by the fact that mathematics is an exact and deductive science, which exhausts the essence of its object, since this is, to a large extent, fashioned by the mind itself<sup>66</sup> and is possessed of a degree of certitude more adapted to our human way of thinking than either the philosophy of nature or metaphysics.<sup>67</sup> The very completeness of mathematics, in its own line, tends to awaken in the mathematician a conviction that, in learning all about his particular object, he has sounded the depths of reality. This is a conviction, however, which even an elementary notion of the scope and methods of this science shows to be absurd. By thus usurping the place of philosophy, mathematics tends to regulate the inferior sciences and to impose its own method on them, a tendency which has more than once called forth the protests of biologists and psychologists, who are brought more directly into contact with living beings, which evade all efforts of mathematization.<sup>68</sup> But it is otherwise with the physical sciences of inert matter, which offer a favorable ground for a progressive mathematization. The application of the mathematical method to the study of physical phenomena has been the greatest revolution in science, and is largely due to Descartes and Galileo; it has given us the now all-important science of mathematical physics.

<sup>64</sup> *In Met.*, Bk. III, L. 13 (nn. 507-513).

<sup>65</sup> *Ibid.*, n. 514.

<sup>66</sup> Cf. E. Meyerson, *La Déduction Relativiste*, Paris, 1935, Payot, pp. 139, 140.

<sup>67</sup> Cf. St. Th., *In Boetium De Trin.*, q. 6, a. 1; ad 2am Quaest.

<sup>68</sup> Cf. W. R. Thomson, *Science and Common Sense*, London, Longmans, 1938; W. MacDougall, *The Frontiers of Psychology*, Nisbet, London, and Cambridge Univ. Press, 1935.

This science endeavors to provide a mathematical interpretation of the physical world, and so it is at once physical and mathematical, realizing perfectly the type of intermediary science known to the ancients only in astronomy, musical theory and optics. By reason of its principles and method, it is formally mathematical, but it is materially physical, on account of its subject matter.<sup>69</sup> It depends on empirical science to furnish its data by induction and observation and to make those precise measurements with which it is entirely concerned and to which it turns in order to verify its conclusions. But its conceptual procedure is mathematical; the real facts and measurements and the physical structure of bodies which observation makes known are symbolically represented by mathematical symbols and linked together by a network of mathematical relations, in order to provide a deductive synthesis, amenable to numerical procedure. It is hence a combination of univocal description and symbolical interpretation.<sup>70</sup> It starts with a real description of facts, but a description which is entirely metrical. "Our scientific information is summed up in measures," says Sir A. Eddington;<sup>71</sup> and again: "The whole subject matter of exact science consists of pointer-readings and similar indications;<sup>72</sup> the whole of our physical knowledge is based on measures."<sup>73</sup> That is why the FitzGerald contraction made such a change in physics; "the constancy of a measuring scale is the rock on which the whole structure of physics has been reared; and that rock has crumbled away."<sup>74</sup>

Having ascertained the metrical properties of its subject, mathematical physics tries to coordinate these into a synthesis of mathematical equations and so provide a hypothetical and mathematical reconstruction of the physical world under its material aspect. This mathematical counterpart of the phy-

<sup>69</sup> Cf. St. Thomas, *Comm. in Bk. II Physic.*, L. 3, n. 8; L. 11, n. 3; *In Boetium*, q. 5, a. 3, ad 6, ad 7; *S. T.*, II-II, 9, 2, ad 3.

<sup>70</sup> Maritain, *op. cit.*, p. 87.

<sup>71</sup> *Op. cit.*, p. xiii.

<sup>72</sup> *Ibid.*, p. 252.

<sup>73</sup> *Ibid.*, p. 152.

<sup>74</sup> *Ibid.*, p. 8.

sical world is a world of symbols and numbers,<sup>75</sup> a subjective world built up by the mind itself, on a plan or outlook "adopted by the mind for its own reasons,"<sup>76</sup> namely, that the symbolic elements may "conform to the mathematical formulae which they are designed to obey."<sup>77</sup> This subjective mathematical substitute for the real world is not intended to provide a causal explanation of it, for the physicist (as such) does not concern himself with the ontological value of his symbols or with the true nature of things. Hence, as in mathematics, his "world-picture" will include many elements which have no objective reality, such as the "sub-ether,"<sup>78</sup> "waves of probability," "isolated electrons," and such like "beings of reason"; while many of the "pictures" of science, as, for instance, those of the inner arrangement of the atom and of curved space-time, are but symbolical representations of entities whose inner nature eludes us.<sup>79</sup> These symbolical reconstructions have a foundation in reality, since they are based on the observed behavior of natural bodies and on measurements experimentally obtained. But, formally, they are only relations of measurement, so constituted as to be apt for use in mathematical deductions.

Mathematical physics thus substitutes a mathematical essence for the real nature of things, and constructs a closed world "consisting of entities rigorously bound to one another by mathematical equations forming a deterministic scheme,"<sup>80</sup> and is thus a triumph of geometrization. For the philosopher, this geometrical and subjective world has no direct signifi-

<sup>75</sup> Cf. Eddington, *op. cit.*, "Science aims at constructing a world which shall be symbolic of the world of common-place experience" (p. xv); "The symbolic nature of the entities of physics is generally recognised" (p. 330; cf. pp. 82, 209); the world of science is a "shadow-world" (pp. 109, 230).

<sup>76</sup> Cf. *ibid.*, p. 219.

<sup>77</sup> *Ibid.*, p. 269; cf. 255, 270, 291.

<sup>78</sup> *Ibid.*, p. 241.

<sup>79</sup> Cf. Sir James Jeans, *The Universe Around Us*, Cambridge Univ. Press, 1929, pp. 125-134. The Rutherford-Bohr picture of the atom is to be preserved, though now modified, because wave-mechanics has not yet furnished a picture of the atom at all. *The Mysterious Universe*, pp. 79, 124-127.

<sup>80</sup> Eddington, *op. cit.*, p. 271.

tion; he realizes that it has an auxiliary and methodological importance, but does well to keep clear of purely scientific questions, especially since there is so much confusion and disagreement between the scientists themselves. But it is necessary that he should point out the epistemological value of the conclusions of this science. Since its method is entirely quantitative, it does not treat of the real nature of things. The relativity theory does not tell us what time is, but seeks to discover the determination of time that is physically possible, and specifies the procedure for so doing. The space-time framework is only a concept, a mathematical invention designed to correlate experiences. The second law of thermodynamics, which is now given the supreme position among the laws of nature, can only correlate states of the universe in so far as they are quantitatively represented in terms of energy, and by reference to a final state of entropy.<sup>81</sup> Action itself is defined in terms of quantity,<sup>82</sup> and so with all the other physical entities. By being thus mathematically represented, things are emptied of any signification other than quantitative, and are transferred from objective reality to the subjective "shadow-world" of physics. The great danger is that this subjective world be regarded as the only real one, thus involving a denial of all that is not quantitative; whereas, by the very procedure by which it is formed, it is only a subjective representation, very incomplete and to a great extent imaginative, of the real world.

It is refreshing to find such a representative scientist as Sir Arthur Eddington admitting the limits of his science and postulating the existence of beings which are not measurable by numbers.<sup>83</sup> He points out the essential insufficiency of the quantitative method in its study of reality: "The incongruity of symbolizing this fundamental intuition (of becoming) by a property of arrangement of the microscopic constituents of the

<sup>81</sup> Cf. A. E. Milne, "Some Points in the Philosophy of Physics," *Philosophy*, Jan. 1934, pp. 19-38.

<sup>82</sup> Cf. F. A. Lindemann, "The Place of Mathematics in the Interpretation of the Universe," *Philosophy*, Jan. 1933, pp. 14-29.

<sup>83</sup> Cf. *op. cit.*, pp. xviii, 85, 86, 209, 271, 275.



world, is evident.”<sup>84</sup> Such notions as mass and distance have some significance beyond mere numbers, but this significance is lost by their incorporation into the scientific scheme, just as the scientific analysis of a picture into particles of paint loses sight of its esthetic meaning.<sup>85</sup> The entities of physics can only form a partial aspect of reality,<sup>86</sup> for “the measure-numbers, which are all that we can glean from a physical survey of the world, cannot be the whole world,”<sup>87</sup> and an array of symbols cannot tell us all about man.<sup>88</sup> The system of inference used in physics is one of reduction to mathematical equations governing symbols, so that what cannot be embodied in a differential equation is ignored.<sup>89</sup> Not only is much of reality ignored, but that which does come into the field of theoretical physics is frankly admitted to be treated in an entirely quantitative manner: “Scientific investigation does not lead to knowledge of the intrinsic nature of things. Whenever we state the properties of a body in terms of physical quantities we are imparting knowledge of the response of various metrical indicators to its presence and nothing more,” so that we leave its “inner un-get-atable nature undetermined.”<sup>90</sup>

These quotations give reason to hope that the attitude of scientists is gradually changing from the pan-mathematicism of earlier years according as the true nature and limitations of science are being more fully realized. By thus restricting himself to his own domain, the scientist not only insures the progress of his science but removes a cause of eternal and useless wrangling with the philosophers, who try to discover the inner nature of things and are not limited to a merely quantitative outlook. The realization that physical science has nothing to say on the inner nature of the atom, of time, of becoming, of existence, and such other realities, paves the way for the harmonious development of both science and the philosophy of nature, in an atmosphere of mutual aid. If we take the

<sup>84</sup> *Ibid.*, p. 97.

<sup>85</sup> P. 106.

<sup>86</sup> Pp. 323, 331.

<sup>87</sup> P. 210.

<sup>88</sup> P. 270.

<sup>89</sup> Pp. 264, 270.

<sup>90</sup> Pp. 303, 304; cf. pp. 257, 258.

attitude of Sir A. Eddington (on these matters) as representative of that of present-day science, we shall also find that the starting point and many of the fundamental notions of metaphysics are admitted as the basis of a higher form of knowledge than that attained by physical science. He tells us that the mind is the first and most direct thing in experience<sup>91</sup> that is capable of making legitimate judgments,<sup>92</sup> and by admitting the distinction between sense and non-sense, between valid and invalid reasoning, he is asserting the necessity of the principle of contradiction and the need of logic.<sup>93</sup> We might almost say that he was paying a tribute to the critical realists of the neo-Thomist school in claiming that "those who in the search for truth start from consciousness as a seat of self-knowledge with interests and responsibilities not confined to the material plane, are just as much facing the hard facts of experience as those who start from consciousness as a device for reading the indications of spectroscopes and micrometers."<sup>94</sup> The philosopher goes to great pains to show how the "potentiality of being known to mind is a fundamental objective property of matter," if by matter we mean physical reality, but Sir Arthur would admit this at once.<sup>95</sup> He also admits that the mind possesses an insight beneath the symbols of science,<sup>96</sup> an insight into our own volitions,<sup>97</sup> into the elementary undefinable "becoming," an insight "which sweeps aside all symbolic knowledge as on an inferior plane";<sup>98</sup> and that "we have direct knowledge of time and the human spirit which makes us reject as inadequate that merely symbolic conception which is so often mistaken for an insight into its nature."<sup>99</sup>

The philosopher does not need to go, hat in hand, to the scientist to ask his permission to assent to such truths; they are evident to any man with healthy faculties and a modicum of reflection. We have given these quotations merely to show that the philosopher need not fear active hostility from scien-

<sup>91</sup> *Op. cit.*, p. 281.

<sup>92</sup> P. 334.

<sup>93</sup> P. 345.

<sup>94</sup> Pp. 288, 289.

<sup>95</sup> P. 267.

<sup>96</sup> P. 272.

<sup>97</sup> P. 312.

<sup>98</sup> P. 97; cf. 88, 89.

<sup>99</sup> P. 57; cf. pp. 91, 320.

tists about these elementary data, and that modern scientists are realizing that philosophy occupies a sphere apart, with methods and objects specifically its own. The claims of the philosopher are not exorbitant; he does not even demand that he be credited with an "insight" into the inner nature of things. He alone is concerned, formally, with this aspect of reality, and he best realizes the immense difficulties which beset the path of the seeker after the knowledge of the nature of things. He asks that the latest scientific theory—which may be cast away by the scientists themselves after a few months—be not thrown in his face as if it were the cut and dried answer to a philosophical problem or the refutation of an ontologically grounded truth. He asks that the existence of thought, the validity of first principles, the reality of such fundamental things as being, becoming, essence and existence, multiplicity and change, be granted—and he can show that the denial of these leads to absolute absurdities. By examining the essential implications of them in the light of first principles, he will build up his own science and justify the spontaneous affirmations of an enlightened common sense as well as the pre-suppositions of science.

Some of the main questions which give rise to conflict between scientists and philosophers are the reality of the external world, of substance and of causality. Science has nothing to say on these subjects, which are quite outside its domain; but scientists have advanced conflicting opinions about them, so that a few words of criticism, and a brief survey of the present trend of thought among scientists on these matters, will help to make clear the distinction between the teachings of science and the private opinion of the scientists.

Sir James Jeans seems to have confused the purely subjective and symbolic world of mathematical physics with the real world, and thinks that the existence of an external world distinct from and independent of our thought is only an illusion. He professes a form of idealism with a Kantian tinge,<sup>100</sup> for he

<sup>100</sup> *The New Background of Science*, Cambridge Univ. Press, 1933, last passage. *The Mysterious Universe*, pp. 135 ff.

believes that the Heisenberg principle has made us give up as insoluble the enigma of the nature of the physical world, and bids us turn to the task of introducing order and simplicity into our thoughts about the world.<sup>101</sup> For him, "nature consists of waves, and these are of the general quality of waves of knowledge, or absence of knowledge, in our mind."<sup>102</sup> When the bewildered philosopher turns to another scientist to find out what this means, he is told that these "waves" are nothing but mathematical elaborations of the imagination, and that "Schrödinger's wave-mechanics is not a physical theory but a dodge—and a very good dodge too,"<sup>103</sup> so good, indeed, that it has tricked Sir James Jeans. But some light breaks on us when we read that "the 'wave' represents our knowledge of the electron. That statement is, however, an inexact way of emphasizing that the knowledge, not the entity itself, is the direct object of our study."<sup>104</sup> So this is a confession of pure idealism, and not merely a scientific theory.<sup>105</sup> If all reality consists of waves (it does not seem to matter much whether they are waves of knowledge, or of the absence of knowledge; such a detail is not significant for the idealist), we may soon be asked to believe that an earthquake is only a mental storm, with "waves of knowledge" lashing furiously against the breakwaters of our mind, and that the mangled bodies of its victims, its ruined houses and all its track of destruction, are but the flotsam and jetsam of our mental storm, washed up on the beach of consciousness.

Sir A. Eddington has also laid himself open to criticism by concluding that color and such qualities are "mental states,"

<sup>101</sup> *Ibid.*, p. 296.

<sup>102</sup> Presidential Address at the British Association, Aberdeen, Sept. 15th, 1934; quoted by H. V. Gill, "Physics at the British Association, 1934," in the *Month*, Nov. 1934, p. 423.

<sup>103</sup> Eddington, *The Nature of the Physical World*, p. 219.

<sup>104</sup> Eddington, *The Philosophy of Physical Science*, p. 51.

<sup>105</sup> This idealistic attitude of Sir James Jeans becomes still more difficult to understand when we recall that he himself (e. g., *The Mysterious Universe*, pp. 79, 124, 126), professes that the ether and its waves are probably fictitious and that wave-mechanics is only a mathematical picture, which does not put us into contact with ultimate reality.

a sort of "mind-spinning," because protons and electrons and such things have not these qualities.<sup>106</sup> The physicist is qualified to affirm that such qualities do not pertain to the world which he considers, but he is not qualified to state which world they do belong to. If he identifies sensation with mental states, he is trespassing outside his own domain, and he shows himself to be rather at sea there. Moreover, if the philosopher admits, with reservations, that the only essence or nature into which we have direct insight is our own conscious nature, he is careful to point out that an introspective analysis of conscious knowledge reveals the existence of another world of reality, since there could be no such thing as knowledge unless we were stirred into activity by the activity of objects distinct from thought.<sup>107</sup> It is contradicting this fundamental insight to assert that the essence of the physical world is mental, or, as he naïvely puts it, "mind-stuff."<sup>108</sup> He asserts: "We reach then the position of idealist, as opposed to materialist, philosophy. The purely objective world is the spiritual world; and the material world is subjective in the sense of selective subjectivism."<sup>109</sup> By the term "selective subjectivism" he means that scientific knowledge deals with the properties of physical objects as observable and as generalized into laws, not as they are objectively, and that this knowledge is determined by the selective effect of the procedure of observation on which it relies.<sup>110</sup> If all he means by this is that the world of physical science is selectively subjective, we quite agree with him; but in trying to determine the nature of the real world, he is, on his own confession, acting as a philosopher, not as a scientist, and he will have to face all the arguments that philosophers have advanced against idealism.

Of the scientists who hold the truth of the objectivity of the external world as a primordial postulate of science, we may

<sup>106</sup> Eddington, *The Nature of the Physical World*, cf. pp. 88, 89, 94, 256, 329.

<sup>107</sup> Cf. *S. T.*, I, 87; *De Ver.*, 10, 8.

<sup>108</sup> *The Nature of the Physical World*, p. 276.

<sup>109</sup> *The Philosophy of Physical Science*, p. 69.

<sup>110</sup> *Ibid.*, ch. 2; cf. pp. VII, 37, 41.



quote such illustrious names as Meyerson, Poincaré, Duhem, Bayel, de Broglie, Bohr, Einstein and Planck. It was indeed to counteract the false conclusions deduced from his own revolutionary quantum theory, as well as to state his own attitude, that Planck published his very interesting book.<sup>111</sup> He says that this question cannot be solved by the scientific method, which is limited to those manifestations of reality that can be perceived by the senses and accurately measured, and that each step in the scientific explanation raises more difficult problems. We have a direct perception of the existence of the external world and it is useless to try to prove it. It will not do to divide reality into the "familiar" and the "scientific" worlds; we must leave room for the most important of all, the *réal* world, which lies beyond both sense knowledge and scientific measurement. The world of physics is a hypothetical world, situated between the world of sense and the world of reality; "it is a deliberate hypothesis put forward by a finite human mind,"<sup>112</sup> and can therefore claim no more reality than the world of sense.

The bifurcation of nature into two totally unlike worlds is entirely artificial and very old. Both the "familiar world" and the "scientific world" are but partial and phenomenal views of the one abiding reality, the real world; both are true in their own way, but both are essentially incomplete. Science has affirmed the partiality of its view, and philosophy, as represented by St. Thomas Aquinas, has long since pointed out the essential relativity of sense-knowledge, since the senses do not attain the nature of things but only make known things as they appear, in their outward appearances, and depend to a large extent on the conditions affecting the sensing subject.<sup>113</sup> The familiar world is indeed formed, to a large extent, of our own unjustified interpretations of sense data, but this should

<sup>111</sup> *Where Is Science Going*, with a preface by A. Einstein; trans. by James Murphy, London, 1933, George Allen and Unwin.

<sup>112</sup> M. Planck, *The Universe in the Light of Modern Physics*, pp. 9-10.

<sup>113</sup> Cf. *In Met.*, Bk. IV, c. 5 sqq., L. 12 sqq., especially L. 14; in *De Anima*, Bk. III, L. 5; *De Ver.*, I, 11, 12; *S. T.*, I, 17, 2.

not lead us to deny the validity of sense knowledge. It should make us try to correct our false interpretations, and science can aid us greatly in this task. Science has told us that we err when we interpret our visual and tactual sensations of a table as postulating the continuity of its material elements. The senses can only tell us what they are meant to represent, just as science can only tell us what it, on account of its means and methods, is meant to represent. We thus get two aspects of the one table, but neither explains the true nature of the table. It is a pity that ignorance of the metaphysical notion of substance should lead Sir A. Eddington to confuse substance with the supposed continuity of the material elements of things, and thus to deny its reality. All his arguments for the existence of a background to the pointer-readings, or metrical characteristics of things, are very like the philosophical arguments for the reality of substance as the permanent basis which sustains the accidental elements in being. This substantial entity is non-metrical and non-observable, but it is not therefore mental, or "mind-stuff." It is material (in corporeal beings), but it cannot be known intuitively, even by the intellect; and it is the duty of philosophy, not of science, to establish or deny its existence and to investigate its nature.

Once the reality of substance has been denied, the denial of causality follows logically, as we have already seen. But Eddington and Jeans claim to have done away with strict causality on purely scientific grounds, by the application of the quantum theory to electronic physics, a procedure which at once arouses suspicion, for it is an effort to solve a philosophical problem by scientific methods. The philosopher has always insisted that empirical science could not discover ontological causality. If that is what Sir Arthur means when he says: "The result of our analysis of physical phenomena up to the present is that we have nowhere found any evidence of the existence of deterministic law,"<sup>114</sup> he is only stating an obvious truth. His notion of causality is entirely uphiosophical, like

<sup>114</sup> "Physics and Philosophy," in *Philosophy*, Jan. 1933, p. 34.

that of substance; it is a sort of time-governed linkage between phenomena <sup>115</sup> and as such has nothing in common with ontological causality. Perhaps the formal thing in this theory is that science does not concern itself with the task of discovering strict causality; <sup>116</sup> if it affirms the non-existence of such causality, then it becomes a philosophical theory and must be criticized as such.

The invocation of Heisenberg's principle to prove that causality does not exist, and not merely that science does not concern itself with it, is quite beside the point. It has often been pointed out that this principle is one not of indeterminacy but of indeterminability, of unpredictability, or of uncertainty. <sup>117</sup> It does not imply lack of causality in nature, but asserts the inability of the scientist to determine simultaneously the position and velocity of intra-atomic entities. And it may be remarked that this limitation holds good for all observations of the position and velocity of all moving bodies, not merely of electrons and protons. A being who knew all about the beings in question, and whose methods of observation did not affect either the position or velocity of such bodies, could arrive at such knowledge; the fact that man cannot, only proves that his methods of observation are imperfect and his knowledge incomplete. James Murphy, summing up Planck's attitude, says on this point: "We have no means whatever of proving or disproving the existence of causation in the external world of nature. . . . [The Heisenberg principle] does not mean that causal sequence is not actually verified objectively. It means that we cannot detect its operation, because, as things stand today, our research instruments and our mental equipment are not adequate to the task. The Principle of Indeterminacy is, in reality, an alternative working-hypothesis, which takes the place of the strictly causal method in quantum physics. But

<sup>115</sup> Cf. *The Nature of the Physical World*, pp. 295, 296.

<sup>116</sup> This interpretation is confirmed by a passage, *op. cit.*, p. 299.

<sup>117</sup> Cf. for instance, F. R. Hoare, "Indeterminacy and Indeterminism," in *Philosophy*, Oct. 1932, pp. 394-403; N. Campbell, "The Errors of Sir Arthur Eddington," in *Philosophy*, April 1931; Max Planck, *Where Is Science Going*, p. 202.

Heisenberg himself would be the first to protest against the idea of interpreting his principle of indeterminacy as tantamount to the denial of the principle of causation."<sup>118</sup> The philosopher may surely take these statements, indicating the attitude of one of the most distinguished of modern physicists, as truly representing the attitude of science today, and is glad to find such confirmation of his own views in science itself. As to the personal opinions of Max Planck, we read: "Here I must definitely declare my own belief that the assumption of a strict dynamic causality is to be preferred. . . . I have not been able to find the slightest reason, up to now, which would force us to give up the assumption of a strictly law-governed universe, whether it is a matter of trying to discover the nature of the physical, or the spiritual, forces around us."<sup>119</sup> If such a deterministic causality were lacking in objective nature, then physical science would have no ground for its inductive process, and some form of subjectivism or scepticism would indeed be the only possible attitude of scientists. But to deny the existence of strict causality on purely scientific grounds is as absurd as trying to find the soul with a microscope, and can only lead to equally disastrous consequences as well as to endless disputes of no utility whatsoever.

It should scarcely be necessary to state that these remarks on the nature of the physical sciences are not motivated by any desire to minimize their value but rather by a solicitude that, by demarcating them off from philosophy and indicating their place in the hierarchy of knowledge, their legitimate progress may be assured and useless conflict avoided. Sir A. Eddington has written: "The conflict (between science and religion) will not be averted unless both sides confine themselves to their proper domain; and a discussion which enables us to reach a better understanding as to the boundary should be a contribution towards a state of peace."<sup>120</sup> And if we have dwelt more on the movement of thought behind scientific

<sup>118</sup> *Where Is Science Going*, p. 32, 33, Introduction.

<sup>119</sup> *Ibid.*, p. 100.

<sup>120</sup> *The Nature of the Physical World*, p. 351.

theories than on the particular forms they have taken, it is because this alone directly interests the philosopher. He is intensely interested in the dramatic search for truth, wherever it may be found, but more so with the attitude that science adopts in its investigation. Epistemology, treating of the nature, value and subordination of the sciences, is a part of critical metaphysics, and is essentially philosophical. Its neglect has given rise to the errors of positivism and pan-mathematicism which we have been considering. Three centuries of the empirico-mathematical method have succeeded in turning our attention to the sensible and have well-nigh stilled in man the desire for any knowledge except that which is useful in practical life. This pragmatic outlook renders philosophy, above all metaphysics, uncongenial to the modern mind.<sup>121</sup> The idea of searching after truth for its own sake, as a good in itself and not as a means of extending our power and domination over material forces, seems ridiculous to the modern mentality. This pragmatism is revealed in the question one often meets: what use is metaphysics? it does not provide us with new inventions or time-saving devices, or gain us our daily bread. No, metaphysics is not useful in this sense; it is a good in itself (*bonum honestum*) a higher form of good than what is only useful and therefore more to be desired than it. The "practical man" will have none of it, however, for he is content with things of a lower order. He regards it as a luxurious training for the mind, if he does not consider it suspiciously as mere woolly abstractism.

Beneath this attitude, it is easy to see the anti-intellectualism fostered by positivism and empiricism. The value of the abstract—which alone can be the object of science—is denied,

<sup>121</sup> The modern distrust of philosophy dates from the Reformation, which not only divided Christendom into different theological camps but destroyed the unity of philosophical thought, by rejecting the *philosophia perennis* that had been the common patrimony of all Christians. It thus paved the way for divergent theories of life, and for conflicts on the most vital and important questions. No wonder that the man in the street is led to believe that there are no common principles underlying life and its problems, and thus adopts a practical attitude which consists in facing each problem as it comes and in the best way possible.



and the value of intellectual knowledge is consequently called in doubt. If we would characterize pre-modern thought, in its essential difference from modern thought, we would say that the former was abstractive, informed by the process of abstraction, whereas modern thought is mainly inductive and empirical.<sup>122</sup> That is why metaphysics, and philosophy generally, could be so cultivated in the past and is so neglected today. Metaphysics is the assertion of the power of the mind to attain to the realm of essences underlying the sensible phenomena, to penetrate within the data of sensible experience to the intelligible necessities which surpass all sense-knowledge, and thus to attain to super-experimental knowledge of absolute certainty. If being as such is the object of the intellect, it is in the science of being as such that the intellect is most true to itself and most certain. But we are not gifted with an insight into the nature of things; and only by a long and arduous process can we ascend from the visible and concrete, by means of the intelligible causations implied in the world, to the full vision of the transcendental realm of eternal and changeless truth. The task of unifying the partial and complementary views of reality into one final and supreme synthesis, by which all beings may be contemplated in their prototype and source and all judgments seen in the supreme principle of thought, will take us a lifetime, even though others have already traced out the path. This final intuition has ever been the aim and end of philosophers as well as of mystics, and Bergson has shown that it can only be gained at the price of years of intense study and devotion to truth. But the prize is worth the struggle, and the joys of contemplation are sweetest of all. We find that the good in itself is not useful, because it transcends that which we call useful, because it is super-useful, and that it is of far more value to us than those limited goods which serve us.

<sup>122</sup> Cf. Mgr. F. Olgiati, "Italian Neo-Scholasticism and its Relation to Other Philosophical Currents," in *Present Day Thinkers and the New Scholasticism*, edited by John S. Zyburn, Ph. D., St. Louis and London, 1926, Herder, Part II, ch. 8.

M. Maritain gives expression to this thought, saying: "What we need is not truths which serve us, but a truth which we serve; for truth is the food of the spirit, and we are spirits by the better part of ourselves. The useless metaphysics orders our speculative and practical intellect, not an order such as the policeman enforces, but an order springing from eternity. It gives man his balance and movement . . . it unravels to him in all the extent of being, the authentic values and their hierarchy. It centers his ethics; it gives to the universe of his knowledge its just place, assuring its natural limits, and the harmony and subordination of the different sciences;<sup>123</sup> and that is more important for man than all the luxuriant fruitfulness of the mathematics of phenomena, for what does it profit a man to gain the whole world, and to lose the rightness of reason."<sup>124</sup>

Physical science will make many errors and its true progress will be greatly retarded if the validity and necessity of a supporting metaphysics is not recognized. The contempt for this supreme science which one so often meets among scientists arises from a complete ignorance as to its true nature and leads to indescribable confusion and to the most absurd aberrations. The scientist uses, in the actual exercise of his science, many philosophical notions which he takes for granted, such as the existence of things independently of thought, the possibility of knowing them in some way, and the necessity of the supreme principles of reason. He has a certain idea of the nature of his

<sup>123</sup> The need for this function of metaphysics is stressed by Hutchins, *op. cit.*, pp. 99, 101: "Metaphysics, then, as the highest science, ordered the thought of the Greek world, as theology ordered that of the Middle Ages. One or the other must be called upon to order the thought of modern times. . . . Both are totally missing today. And with them has gone any intelligible basis for the study of man in his relations with other men. . . . A similar degradation overtakes natural science. If the world has no meaning, if it presents itself to us as a mass of equivalent data, then the pursuit of truth for its own sake consists of the indiscriminate accumulation of data. . . . We believe, then, that if we can gather enough information about the world we can master it. Since we do not know precisely which facts will prove to be helpful, we gather them all and hope for the best. This is what we call the scientific spirit."

<sup>124</sup> *Les Degrés du Savoir*, pp. 9, 10.

science and its position in the hierarchy of knowledge, and supposes that his ideas are distinct from the objects which he considers. This pre-philosophy may be rudimentary and unconscious, but it is none the less real for that. If the only science which can justify these presumptions is held in contempt, physical science itself will suffer and will be deprived of all its reference to objectivity.<sup>125</sup> The sciences also have reference indirectly to the being of things as to the foundation of the explanatory representations which they elaborate. Since they depend on observation, and thus on the intuition of the senses, they, like the senses, declare implicitly the existence in the world of hidden ontological structures, which, however, transcend the scope of science.<sup>126</sup>

In an era of countless inventions and great material advancement, dominated by the gospel of progress, it is but natural that we should be inclined to neglect the ancient philosophers who have spoken for all time. We are so impressed by the progress of the sciences that we assume that similar progress has been made in all the other fields of thought, and we think it a waste of time to read anything but the most modern books or to discuss anything but the current events.<sup>127</sup> We thus cast

<sup>125</sup> There are signs that scientists are coming to recognize the need of metaphysics from a purely scientific point of view. Sir Arthur Eddington's book, *The Philosophy of Physical Science*, seeks to formulate the philosophy to which scientists stand committed by their practice. The recent developments of science force scientists to inquire into the nature of the knowledge they try to obtain and to investigate the scope and validity of the observational processes used in science. Sir Arthur, however, is mistaken in thinking that epistemology pertains to science. He realizes that it treats of the nature of knowledge (pp. I, 22, etc.) and sometimes says that it is a part of philosophy. In other places (pp. 18, 49, sqq.) he says that it is a part of physics. This is in direct contradiction with what he has said on the scope of physical science, which is concerned with measurements and does not treat of the nature of things.

<sup>126</sup> Cf. Maritain, *op. cit.*, pp. 301, 302.

<sup>127</sup> Cf. Hutchins, *op. cit.*, pp. 24, 25, 26: "Our notion of progress is that everything is getting better and must be getting better from age to age. Our information is increasing. Our scientific knowledge is expanding. Our technological equipment in its range and excellence is far superior to what our fathers or even our older brothers knew. . . . In intellectual fields we have no hesitancy in breaking completely with the past; the ancients did not know the things we know; they

aside the grand intellectual heritage of past ages, as if only the moderns had anything of importance to say to us, as if they alone had the monopoly of eternal truth. We forget that human nature is essentially the same now as when Aristotle walked in the cloisters of the Lyceum, or when Aquinas was lost in contemplation in his narrow cell; that nature presented the same problems then as now; and that truth founded on the essences of things is as unchanging and eternal as the essences themselves. A perverted sense of values has led us to regard what is new as what is better, and what is more detailed as more profound. The craze for innovation, which has characterized the world since the reformers broke away from all tradition, has fostered this false notion of progress, and in the search for novelty we have lost what had already been acquired. "Those who were eagerly grasping at new truths were almost indifferently dropping certain older truths. This is the constant Nemesis of what we call 'Progress.' Any new, or even rediscovered, truth is, for the moment, more important for us than what we already know. Men will die to make a very small discovery; but when it is made, and securely our own, it falls into its proper place, and is seen to be far less important than some of our former knowledge."<sup>128</sup> Man directs his life to the attainment of happiness, and applies his knowledge to reaching those conditions which will realize this happiness. Experience and such application add to the sum of knowledge, and most instruments are perfected through experience. But things are

had never seen steam engines or aeroplanes or radios, and seem to have little appreciation of the factory system. Since these are among the central facts of our lives, how can the ancients have anything to say to us? The tremendous strides of science and technology seemed to be the result of the accumulation of data. The more information, the more discoveries, the more inventions, the more progress. The way to progress was therefore to get more information. The sciences broke off from philosophy, and then from one another, and that process is still going on. . . . We begin, then, with a notion of progress, and end with an anti-intellectualism which denies, in effect, that man is a rational animal." For a penetrating discussion of the nature and value of progress, the reader is referred to Christopher Dawson, *Progress and Religion*, London, 1938, Sheed and Ward, Unicorn Books.

<sup>128</sup> Noyes, *op. cit.*, p. 59.

not only discovered during this gradual process; they are also forgotten.<sup>129</sup> "The advancement of knowledge in one direction does not necessarily mean that we have added to our knowledge as a whole. The human mind is so constituted that, when it acquires a new truth, it sometimes drops, not only an old error, but an old truth."<sup>130</sup>

Time not only brings new knowledge, it also tests the enduring power and inner vitality of truth once acquired. No philosophy has stood this test better than the *philosophia perennis*, initiated by the Greeks and welded into a magnificent synthesis by St. Thomas Aquinas. Apart from its inherent power to satisfy the deepest cravings of the mind after truth, to solve modern problems, to assimilate all the new findings of lasting philosophical value, as well as to impart a deeper significance to modern scientific theories,<sup>131</sup> its survival and development down the ages and its amazing spread in our own day are signs of its eternal truth. The body of old and disproved scientific theories has been cast off, but it never was an essential, or even an integral, part of the philosophical system, just as the scientific theories of today, or of tomorrow, do not form part of our philosophy. The soul of this philosophy remains the same, though the body of scientific thought which it informs renews itself from age to age. We do not claim that nothing new or important has been said since the Middle Ages; there is no philosophy that has not some truth in it, and many old truths have been considerably developed in their applications since the days of the Scholastics. The *philosophia perennis* is a signpost, not a boundary, as P. Sertillanges has said. Its eternal principles are directive of life and thought and its assimilative force is inexhaustible. It is as if the great philosophers of the past were content, nay, ardently inspired, to formulate these unchanging truths which are vitally necessary to man in his quest for truth and in his practical life, leaving

<sup>129</sup> Cf. Hilaire Belloc, "Progress," in *Studies*, Dec. 1920, pp. 497-511.

<sup>130</sup> Noyes, *op. cit.*, p. 137.

<sup>131</sup> On this point, cf. J. Maritain, *Le Docteur Angélique*, Paris, 1930, Desclée, ch. 3: "L'Apôtre des Temps Modernes."



to later ages the task of developing the particular sciences, a task which only centuries of detailed research could fulfil. It will be distasteful to the modern mind to be asked to return to these great pioneers of thought, who have never since been surpassed. The labor of separating the grain from the chaff, the underlying truths from the scientific theories invoked as examples, and the strangeness of the terminology, which, despite its literary crudeness, was exact,<sup>132</sup> make this return doubly difficult. But this task has been performed, and is still being continued, by men who have dedicated their lives to opening up to the world this unfailing well of truth. It is from this well that we have drawn in these pages in order to outline the respective positions of philosophy and science, and to indicate that the old philosophy and the new science are not antagonists but partners in the common quest of truth.

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<sup>132</sup> Cf. Prof. G. Santayana, in Zyburg, *op. cit.*, p. 74: "The fixity and clearness of the Scholastic vocabulary are a relief from the Babel of figurative terms and perverse categories confusing modern philosophy, and making the despair of anyone who wishes to think cogently and not to be misunderstood."

## BOOK REVIEWS

*Carmelite and Poet: A Framed Portrait of Saint John of the Cross*, with his poems in Spanish. By ROBERT SENCOURT. New York: The Macmillan Co., 1944. Pp. xiii + 274, with index. \$3.00.

Previous reviewers have judged that, although this book was written with genuine enthusiasm, it is "too wordy and woolly," contains a few historical errors, adds nothing to the extensive literature on the saint, and exhibits a considerable lack of theological background. It is unnecessary for us to cover this ground again. Instead, we shall try to indicate the fundamental weakness in the author's portrayal of St. John as a mystic. We shall not, therefore, comment upon Mr. Sencourt's conception of St. John the poet. It is our belief that the author of *Carmelite and Poet* has failed to grasp the doctrinal unity binding the saint's works into one; nor has he understood the supernatural principle of grace operating as the basis of the saint's teaching. This has resulted in a poorly "framed portrait" of St. John of the Cross as the great mystical doctor.

St. John's doctrinal unity is apparent in his four major works, which form the "summa" of his teaching and are undoubtedly authentic: *The Ascent of Mount Carmel*, *The Dark Night of the Soul*, *The Spiritual Canticle*, *The Living Flame of Love*. In addition, there are poems, letters, and maxims. Although a number of the letters have been lost or destroyed, nevertheless we have, in the four above-mentioned works, the complete teaching of the saint of Carmel. Scholars disagree as to their chronological order, but that matters little. All the works were written within a few years of each other, and St. John was in full possession of his complete doctrine when he began to write. What is to be noted is the logical sequence in which we have listed the books. The saint is inflexibly logical; and his works, therefore, demand attentive and repeated reading. So carefully are they knit together that only constant study, as he himself warns us (*The Ascent*, Prologue, n. 8), will reveal the train of thought that runs a straight course through them.

But what is this thread of doctrine that so harmoniously weaves through St. John's works and makes of them a whole? It is his teaching on the meaning of perfect union of the soul with God, and a thorough description on how to arrive there. The frontispiece of the critical edition of *The Ascent of Mount Carmel*, which is also reproduced in the English translation of Peers, contains an original sketch by St. John showing the road to perfection and the summit that is to be reached. In this allegorical

sketch is contained, symbolically, the central theme of his whole doctrine. All his major works explain either the summit of the mount, or the path leading to it. We grasp their value when we reflect that the Carmelite friar, having reached the summit of perfection, is now looking down explaining the direct path that leads to the top of the mount and pointing out the two side-paths, half way up the mountain, that lead to thick entangling forests and impassable hills beyond which there is no advance.

That St. John teaches only one direct way to the summit and only one type of divine union (and that mystical), which he also calls the state of perfection, can be proved from the fact that his description of divine union is one and the same in all his works. By this union he means simply the conformity of the creature's will with the will of God. Not *any* conformity, but *perfect* conformity is the summit of Carmel toward which we climb. Even in *The Ascent*, this is the goal placed before generous souls. But the saint does not teach that all souls must reach the same high degree, or that the union is realized in the same manner by all. "The state of this divine union consists in the soul's total transformation, according to the will, in the will of God, so that there may be naught in the soul that is contrary to the will of God, but that, in all and through all, its movement may be that of the will of God alone" (*The Ascent*, B. I, Ch. 11, n. 2; cf. *Ibid.*, B. II, Ch. 5, n. 3).<sup>1</sup>

This perfect conformity is not the work of man alone. It demands more than ascetic labor: it calls for the infused movements of the Holy Spirit, if a perfect soul is to be forged. Thus, this state of union has an element of passivity about it that makes it mystical. "Wherefore the functions of the memory and of the other faculties in this state (of union) are all divine; for, when at last God possesses the faculties and has become the entire master of them, through their transformation into Himself, it is He Himself who moves and commands them divinely, according to His Divine Spirit and will; and the result of this is that the operations of the soul are not distinct, but all that it does is of God, and its operations are divine" (*The Ascent*, B. III, Ch. 2, n. 8).

Writing some time later in *The Living Flame of Love*, the saint holds tenaciously to the same explanation. "All the movements and operations which the soul had aforetime, and which belonged to the principle and strength of its natural life, are now in this union changed into divine movements, dead to their own operation and inclination and alive in God. For the soul, like the true daughter of God that it now is, is moved wholly by the Spirit of God, even as St. Paul teaches, saying: That they that are

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<sup>1</sup> All quotations from St. John are taken from Peers, E. Allison, *The Complete Works of Saint John of the Cross*, translated from the critical edition of Silverio de Santa Teresa, O.D.C., London (1934), 3 vols.

moved by the spirit of God are sons of God Himself" (S. II, n. 34; cf. *The Spiritual Canticle*, XII, 10; XXVII, 2).

The union is the same in all his works. *The Ascent* and *The Dark Night* merely point out the goal while explaining at length the way to it. *The Spiritual Canticle* and *The Living Flame*, on the other hand, relate *ex professo* the experiences of the soul that enjoys the perfect union with God on the summit of the mount.

We have insisted upon this logical connection because there are some spiritual writers who claim that the union with God described in these works is not a union identical in nature. If their opinion were true, then there would be no doctrinal unity in the works of St. John. He would be explaining two different unions with God, one which may be termed ascetical, and the other, mystical. There would be then two different roads, the ascetical as described in *The Ascent*, and the mystical as described in *The Dark Night*. The practical conclusion would be that those not called to the mystical life should content themselves with the teaching of *The Ascent* alone. But it is clear from our quotations that the end pointed out in *The Ascent* is identical with that of *The Living Flame*.

Mr. Sencourt admits doctrinal unity in broad outline, but he fails to explain precisely what it is. Nor does he give a clear idea of the nature of the divine union, which we have discussed above. From his discussion of the relation between *The Ascent* and *The Dark Night*, it seems that he is unaware of their complementary necessity on the road to perfection.

What is the relation of *The Ascent* to *The Dark Night*? Both explain the way to union. Both point out the straightest path leading to the summit. They form, in reality, one single treatise. Both explain the nights, that is, the detachment from creatures and self that the soul must undergo to reach union with God. This purgation, which leaves the soul arid and without consolation, is rightly described as a period of darkness, a night. There are two nights—the night of the senses and the night of the spirit—which correspond to the sensitive and the spiritual parts of human nature. Each night has an active and a passive aspect. When the soul is the predominant agent in the purification of the senses or the spirit, the action is called active purification. When God is the predominant agent, it is called passive purification. The active purification is explained in *The Ascent*, the passive in *The Dark Night*. The first thirteen chapters of the former explain the active purification, and since this is the work of beginners, it is the easiest to understand. Due to this ready intelligibility, some stop reading here in the belief that this part is meant for all, but the remainder only for the select few. They fail to see that *The Ascent* and *The Dark Night* are so related that the teaching of both is necessary for divine union. The two works are not different roads leading to different goals; they are not parallel, but complementary. Nor

does *The Dark Night* merely repeat more extensively what was said in *The Ascent*. *The Dark Night* explains the passive purification without which the soul could not advance to the summit. "And the divine effects which God causes in the soul when He has granted it this habit, both as to the understanding and as to the memory and will, we shall not describe in this account of the soul's active purgation and night, for by this alone the soul does not completely attain divine union. We shall speak of these effects, however, in treating of the passive night, by means of which is brought about the union of the soul with God" (*The Ascent*, B. III, Ch. 2, n. 14).

Mr. Sencourt has not perceived this essential relation. He regards *The Dark Night* as a more elaborate exposition of what was said in *The Ascent*. "The saint felt he must go over the ground once more" (p. 136). The author, however, does not bring out the fact that the passive purification is a complementary and necessary step in the soul's ascent. Indeed, he seems to place so much emphasis on the passionate poetry of *The Dark Night* that he overshadows the predominant purpose of the saint's writings: "To direct the soul through all its natural and supernatural apprehensions in purity of faith to divine union with God" (*The Ascent*, B. II, Ch. 28, 1).

It will easily be seen from our previous exposition of the saint's teaching why we must reject the theme of Transcendence and Immanence which Mr. Sencourt has inserted therein. By the way of transcendence the mystic goes directly to God, stripping himself of all the joy he might find in created things. But, having arrived at the state of union, he sees all beauty in God, and through God all created beauty, which before he relinquished and now begins to enjoy. In a burst of enthusiasm Mr. Sencourt writes: "Try as he might to put by the beautiful things he loved, and so worship the invisible alone, he was aware that he loved them still; they opened his secret raptures" (p. 147). St. John, as we have seen, admits only one way, that of total abnegation. Even in *The Spiritual Canticle* and *The Living Flame*, he recalls his advice of a negation that he elaborated in the other two treatises. But one must understand this total abnegation. John does not demand a suppression of the sensitive life, but its perfect subjection to the spiritual life. Even on the way to God (way of transcendence, to use Sencourt's phrase) the sensible and the beautiful may be used as long as we are not attached to them, and they lead us to God. Therefore, at least here there is no room for the theory of transcendence and immanence.

We come now to our second observation. How does the soul climb the mount and unite itself to God? Is it capable of uniting itself to God under its own power? The nature of the divine union is difficult to understand. It is a union in Faith and Charity. One must experience it, we are



told, in order to understand it fully. But, since mysticism depends on dogma for its interpretation, we can at least know the theological background which St. John used to explain it. It is here that Sencourt leaves the reader confused. As we have said, for St. John union with God is a mystical state, that is, a state in which the soul is passive under motions of the Holy Spirit. It is a union in the supernatural order, the attainment of which is above all the efforts of man. Catholic theology teaches that man lives in a supernatural state destined for a supernatural end, the vision of the Triune God. This state and end, therefore, is a pure gift of God to which man by nature has no title. Sanctifying grace is the divine quality which lifts the soul of man above the natural order, makes him a consort of divine life, an adopted son of God; and it is the seed of glory. But even as a son of God man cannot lift himself up into the mystical state of union. This, too, is another gift of God. Man might prepare himself but God gives Himself to whomever He wishes and whenever He wishes (*The Dark Night*, B. I, Ch. 9, n. 9). Theologians differ as to whether this mystical union described by St. John, which he also calls the state of perfection, is the ordinary terminus of all those who reach sanctity, or whether it is an extraordinary gift reserved for a select few. Yet they all agree that it is a special divine gift above the natural power and needs of man. It is here that Christian mysticism differs from all forms of natural or diabolical mysticism.

There are, for example, natural mystics who have many good qualities. Many of their characteristics resemble those of the Christian mystics. They retire from the world, seek solitude and silence, curtail sensible pleasures, undergo painful purification of the soul, meditate by their natural powers on the beauty of nature and the greatness of God. They even aspire to a contemplation of the divine nature which they know from natural reason, but this effort is usually crowned with tension and exhaustion. For them contemplation is an end; for the Christian it is only an attitude of the soul; love of the Triune God is the end.

Furthermore, these natural mystics use expressions, aspirations, and other forms of prayer which are almost identical with those of the Christian mystics. This should not surprise us, since Christian mysticism does not destroy human nature, but supposes it, perfects it, and transforms it.

Yet in spite of these similarities these natural mystics remain deprived of grace and of a divine call, and by their own effort they are incapable of attaining to the intuition of, and union with, the Trinity. Strive as they might, they can never attain supernatural Faith and Charity by their own efforts in order to enter into the very life of God. We should never be deceived by mere resemblances.

Now it is precisely this distinction that *Carmelite and Poet* fails to evaluate properly. To be sure, Sencourt admits a distinction between the

natural and the supernatural. In his Introduction he reminds the reader that Christian mysticism is unique. But in the body of the book his loose modes of expression give the impression that the author has not understood the matter. Sencourt, lost in the wonders of the saint's poetry, tends to obscure the theme of the poet by concentrating on the resemblances that are found in common with some English poets (p. 219). A true portrait might justifiably include these resemblances, but it certainly would sharply distinguish them, depicting in fuller color the unique position of Catholic mysticism.

Natural contemplation of beauty, no matter how intense, that finally results in mental quietness, does not lead to sanctity in divine union. It has only a resemblance to Christian contemplation. The mental quiet in natural mysticism can be acquired by human effort. The prayer of quiet mentioned by St. Teresa and St. John is a gift of God beyond the grasp and the power of unaided human nature. It is misleading to say: "The better way can never be learned except by those who have made effort enough, or endured enough, to have their nerves tired out" (p. 150).

The framed portrait by Sencourt lacks firmness of shape and outline because the author lost sight of and failed to understand the central theme that runs through the major works of St. John: The direction of souls to divine union with an explanation of all the natural and supernatural (visions, ecstasies, etc.) apprehensions of the soul along the way and in the highest degree of union.

Our criticism of *Carmelite and Poet* has been of necessity completely adverse because we have limited it to what we believe is fundamental to an understanding of the mystic. It would appear from Mr. Sencourt's Introduction that he was well aware of the path he had to follow—indeed, he approached his task with genuine enthusiasm. It is regrettable that he has not succeeded in achieving his purpose.

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*The Judgement of the Nations.* By CHRISTOPHER DAWSON. New York: Sheed & Ward, 1942. Pp. 222. \$2.75.

Most books, if they are not reviewed as soon as they are published, need not be reviewed at all. Others, either because of the authority of the author or the importance of the content, can always be profitably considered. In the case of the present work, it is fortunate that we can consider it now and ask some questions about it that might have been more disturbing and more easily dismissed if they had been brought up sooner.

## I

Mr. Dawson's intention in this his latest work is clearly practical in nature—to heal the dissension and disunities of nations through a return to the love and service of God. It includes an analysis of the forces that brought about the present diseased state of the world and a discussion of the measures necessary to bring about a cure, if that is possible. Western civilization has reached a judging point in its history: it has two alternatives—a continuation on the path to destruction or a complete Christian renewal.

The work has two main divisions: the first part exposes the historical forces which brought European civilization to its present state (*The Disintegration of Western Civilization*); the second part is more patently theological and attempts to show the Christian principles that must underlie any enduring and just civilization (*The Restoration of a Christian Order*).

The scientific and technological advances of the last few centuries have become the primary instruments of the greatest effort ever attempted to destroy and subjugate man; consequently the present crisis is unequalled by anything in history. There are two reasons for this. First of all, the nations that are making the greatest bid for power ever attempted have weapons, both physical and psychological, unknown to previous conquerors. Secondly, the civilization which is threatened with destruction is a Christian civilization, whose fall would be incalculably more disastrous than the fall of the Roman Empire.

In the face of this totalitarian drive for power, liberal humanism, the secularized version of Christianity, which was the enemy of the last century, is no longer to be regarded unqualifiedly as an enemy. It is also threatened by the new enemy, an enemy so menacing that in its presence the partial conflicts dividing Western civilization acquire a different aspect. For now the very existence of our whole culture is at stake; in such a situation cooperation with any elements that uphold freedom is to be desired. The great danger of the present war is that in the very struggle democracy will suffer defeat from within. For it is possible that the exigencies of the present moment may force the democratic nations to organize their life on totalitarian lines. At stake is the civilization built on Christian principles and the western ideal of liberty. This war is a war for democracy; the author is careful, however, to exclude from this any idea of equalitarianism. "Still less are we fighting for the squalid prosperity of the economic liberalism of the last century. What we have to defend is, to quote Cardinal Lienart's words, 'a human and Christian civilization built with infinite patience,' a work to which many races and schools of thought have contributed century after century" (p. 24).

The author lays emphasis on the fact that the present world conflict is basically a conflict between contrary conceptions of the natural law and their consequent public moralities. Luther's view of the natural law is the force behind German culture, while Calvin's view, which, according to Dawson, is fundamentally identical with the Catholic conception, is the spiritual inspiration behind Western democracy. "This Lutheran tradition with its strange dualism of pessimism and faith, other-worldliness and world affirmation, passive quietism and crude acceptance of the reign of force, has been a most powerful force in the formation of the German mind and the German social attitude" (p. 43). "Here Luther's cult of force and his 'natural law of irrationalism' becomes transformed into the cult of militarism and of a non-moral or super-moral *Machtpolitik*" (p. 44).

Part of Mr. Dawson's thesis is that modern democracy is peculiarly the product of Calvinism and the free churches. Thus the Cromwellian commonwealth was the starting point of the new civilization which stressed freedom of conscience and the person as absolute rights bestowed by God and nature. In America, the Calvinism of New England led to the pronouncement of the rights of man in our Constitution and inaugurated political democracy. Summing up, the author says: "Thus the modern Western belief in progress, in the rights of man and the duty of conforming political action to moral ideals, whatever they may owe to other influences, derive ultimately from the moral ideals of Puritanism and its faith in the possibility of the realization of the Holy Community on earth by the efforts of the elect. While the German combination of realism and mysticism, of external discipline and internal anarchy, which is so alien to our way of thought, has its roots in the Lutheran world view with its concepts of the mighty forces of irrational nature and irresistible grace" (p. 51).

Mr. Dawson places the ultimate cause of the disunity of our civilization in the fact that religion, which should be a unifying force, is itself in a state of disunity. It is this religious disunity that is the cause of our secularized civilization. This, he maintains, is a unique problem in world history, "the problem of a state of dislocation between religion and culture; in other words, the problem of a secularized culture" (p. 97). The banishment of the Christian Faith doomed Europe to disunity and collapse, for Europe, unlike, for example, China or India, has no natural bond of unity; the spiritual community of the Church furnished the only bond.

The author carefully separates the ideological basis of liberalism from the many variegated manifestations which have passed under this somewhat ambivalent name. He finds this basis in the ideal of freedom, which, rather than equality, has been the spiritual ideal of Western culture. His

acceptation of the term freedom is not defined; he says merely that he does not mean the "lawless individualism of the barbarians."

## II

The second part of Mr. Dawson's book regards the task of restoration from an explicitly theological viewpoint. The idea of a planned society is discussed. Because of the primacy of the Spirit, the author insists that the vitalizing power of any culture must come from its subordination to the spiritual. The failure of our secularized culture makes this more evident. The redeeming power of God's grace is efficacious to save not only individual sinners but also erring civilizations; the importance of this principle is paramount today for what is at stake is not the collapse of a Christian culture but rather the collapse of the secularized culture that has taken its place. The new state claims control of the whole of human life, and the inventions of science make this possible to an extent never before dreamed of by rulers of the past. "No human power can stop this progress to the abyss. It can only come about by a profound movement of conversion which brings the human spirit once more into vital relation with the Spirit of God" (p. 157).

Religious division, as has been shown, is one of the primary causes of the present world situation; Mr. Dawson concludes that a return to religious unity is a necessary condition for the restoration of the spiritual community of Europe. He holds that cooperation among the various religious bodies is essential and that such cooperation is possible on the basis of the traditions, beliefs, moral values, sacraments and forms of worship held in common. The theological virtues of faith, hope, and charity provide the best basis for unity in the intellectual as well as the spiritual sphere. More immediately, he is persuaded that our age is more favorable to Christian unity than any since the Reformation; for as their religion is becoming that of a persecuted minority, the pressure of hostile forces may well force Christians to unite against a common enemy; "or it may be that the Church will react positively to the situation by a fresh outpouring of the apostolic spirit, as Bl. Grignon de Montfort prophesied two centuries ago" (p. 182).

On the political level the problem is to find a center of unity between individual states and one world organization. The author suggests the creation of "not a League of Nations, but a confederation, a league of federations, based on community of culture and each organized as a society of nations of states with autonomous rights" (p. 214). But he finds the difficulties inherent in such a plan so great that they far exceed the scope of the politician or economist. "The reconciliation of the nations can only be accomplished on a deeper plane than that of political power or economic



interest. It is essentially a spiritual task which demands the spiritual vision that is Faith and the spiritual will that is Charity" (p. 221).

### III

It is with some hesitation that we approach the critical part of our review; yet, after due consideration, we have been forced to the conclusion that this present work of Mr. Dawson is puzzling and disturbing. Many times it is difficult to recognize that the man who wrote *Religion and the Modern State* and *Beyond Politics* is also the author of *The Judgement of Nations*. The author's views in this book are sharply at variance with those advanced in previous works; moreover, there are numerous inconsistencies in the arguments advanced; most notable of all, there is a persistent vagueness and ambiguity, chiefly in the use of several important terms.

We shall start with the last point; the best example of this is the use of the term democracy. On p. 21 the author means by democracy self-government, based on the ideal of personal liberty, embodied in representative or parliamentary institutions. On p. 24, he says he does not mean by democracy merely political institutions. He calls democracy the spiritual heir of Christendom, then shows how it is a product of Calvinism and puritanism. Could not Nazism also be called the spiritual heir of Christendom, since, as Dawson points out, it is in many respects the product of Lutheranism? He then says that democracy is not an adequate name for the set of values we are defending; in another place he identifies democracy with our whole Christian civilization, and all that is good in it.

In previous works Mr. Dawson has shown that liberal democracy is but another form of the universal tendency today toward the growing influence of the state in the life of the individual; it is the counterpart of the totalitarian state proportioned to the humanitarian traditions of the Western countries as Nazism is proportioned to the German militarist tradition. He has clearly analyzed the extension of the function of the state and its growing demands upon the life of the individual to the point that the individual is more and more moulded by the dominant ideology of the state; and the ideology of the democratic state has been the primacy of economic ends. As he had well said elsewhere: "We can already discern the beginnings of this paternal-democratic regime in England and can see how all the apparatus of the social services—universal secondary education, birth control clinics, antenatal clinics, welfare centers, and the rest—may become instruments of a collective despotism which destroys human liberty and spiritual initiative as effectively as any communist or Nazi terrorism" (*Religion and the Modern State*. New York: Sheed & Ward, p. 106). "It may be harder to resist a totalitarian state which relies on birth-control

clinics and free milk than one which relies on castor oil and concentration camps" (*loc. cit.*).

There are, of course, many traces of his previous position on democracy interwoven with his new identification of democracy with Christian civilization; this only makes his present position difficult to understand. Previously Mr. Dawson has insisted on the distinction between English Parliamentaryism and French democracy, and emphasized the error that follows from a facile identification of the two. He has also said: "The truth is, unpalatable though it may be to modern 'progressive thought,' that democracy and dictatorship are not opposites or mortal enemies, but twin children of the great Revolution, and that the English political system is immune from the tendency towards dictatorship because it is not democratic in the full sense of the word, but rather liberal and aristocratic" (*Beyond Politics*. New York: Sheed & Ward, pp. 40-1).

The same difficulty is found with the author's use of the term freedom. Nowhere does he give an adequate definition of his use of the word. And since he equates liberalism with freedom, this confusion extends to the former word as well. Mr. Dawson says that freedom or liberty is central in the Western tradition and hence in modern democracy. But one wonders to what kind of freedom he is referring. He says that it is not the freedom of economic individualism or lawless barbarism. His one positive statement is correct but limited: referring to a social order that has Christian freedom as its basis, he says: "This means that it must be a social order directed to spiritual ends, in which every man has a chance to use his freedom for the service of God according to his powers and gifts" (p. 185). But this one oblique statement seems hardly sufficient in a book that is primarily about the necessity of preserving this Western ideal of freedom. The necessity of an adequate analysis of the Christian ideal of freedom becomes more apparent in the face of the pernicious errors widespread in the modern world concerning its nature. Human freedom has been exalted to the status of a first principle; the very indeterminacy of the human will, which is properly an imperfection and as such is potent to draw down the divine mercy, has been glorified as a perfection. This is an abomination well calculated to cut off mankind from the divine mercy, for no one is less worthy of mercy than the "poor proud man." Has Mr. Dawson any assurance that he will not be understood to be speaking of this kind of freedom, which is the dominant conception of democratic society. It might even be thought that the Church sanctions this perverted doctrine of freedom, which is the fruit of man's pride and has more affinity with the French Revolution than with Catholic doctrine.

In previous works Mr. Dawson had clear and definite views on the relation between individual freedom and state authority, and, consequently, on the relation between the common good and the individual good. (Cf.

"Catholic Doctrine of the State," in *Religion and the Modern State*.) In the present work he seems to have reacted against totalitarianism in such a way as to deny the truth that it distorts, that is, the principle of community, which is the force behind the totalitarian doctrine. He now places undue emphasis on the individual good and the freedom of the individual. At bottom his difficulty seems to involve an erroneous conception of the common good. Thus, he says: "Western democracy has been the will to erect a society which . . . protected . . . the freedom of the individual against the unlimited authority of the state itself." From one viewpoint this is but the outgrowth of defending the freedom of the individual against the unlimited authority of God Himself; just as totalitarianism is the outgrowth of the complete denial of human freedom from the Lutheran view of Divine omnipotence. Mr. Dawson quotes Burke with approval: "All the old countries of Europe were agreed on the common principle that the state is made for the people, and not the people conformed to the state, but England differed from the rest in that it made personal liberty a direct object of government and refused to sacrifice the individual to the community or the part to the whole" (p. 185). Both of these statements err in this, that they singularize the common good and thus make the common good and the private good alien goods, as though the common good were not the greater good of the individual, and as though the true private good could be opposed to the common good. The state becomes an alien power against which the individual must continually defend himself. In this the individualistic and totalitarian theories of government agree, for they both deny the community of the common good. Civil life becomes a warfare between two powers—individual freedom and the omnipotent state; either the state dominates the individuals or the individuals, with their individual good exalted to the status of an end superior even to the common good, dominate the state.

#### IV

Although Mr. Dawson is well aware of the various anti-Christian forces that have contributed to the breakdown of our culture, he also points out that "we cannot refuse all responsibility and put the blame on the shoulders of the rationalists and anti-clericals. For . . . the primary cause of the secularization of Western culture has been the religious divisions of Christians. Behind the present crisis in Europe there lie centuries of religious disunity and strife which have divided men's minds in the spiritual order itself and which have destroyed the bonds of charity which alone can transcend the conflict of material interests and the corporate selfishness of classes and peoples" (pp. 191-2). Now this is a point of the greatest importance and one which does not begin to be sufficiently recog-

nized. Unfortunately Mr. Dawson's formulation does not evaluate with sufficient precision the nature and proportion of responsibility for the present crisis borne by the various elements in our culture. He does manifest the degree to which rationalism, liberalism, capitalism, and so forth, must be held responsible; he quite justly points out the greater responsibility borne by Christians. But he ignores the peculiar responsibility of Catholics, for whom there is no excuse, knowing, as they should, that they are called upon to be the leaven of the world. The degree to which the sins of the world are upon the members of the visible Church is not recognized. "And that servant who knew the will of his Lord and prepared not himself, and did not according to His will shall be beaten with many stripes. But he that knew not and did things worthy of stripes shall be beaten with few stripes. And unto whomsoever much is given, of him much shall be required: and to whom they have committed much, of him will they demand the more" (*Luke*, xii, 47, 48). There is a vital relation between the health of the world and the health of the Church. The one barrier against the forces of evil latent in fallen human nature is the relatively small group of the faithful, whose function it is to supply the saving leaven which alone makes the earth pleasing to God. The saints, who are our models, always considered themselves, by their sins and infidelities, responsible for the sins of the world; nor can this be dismissed as exaggeration, since they alone among men see things as they are. And in this they are but imitating Christ, who, although sinless, assumed the burden of all men's sins. The saints alone, then, realized the tremendous responsibility placed upon the faithful, for the justice or mercy of God will be called down upon the world in proportion as Catholics pursue sanctity or mediocrity.

## V

Mr. Dawson's failure to indicate the unique nature of the responsibility of Catholics for the disintegration of our civilization necessarily detracts from the adequacy of his analysis: it also has important bearings on the practicality of the remedies he proposes. Having shown that religious disunity is the primary cause of our secularized civilization, He advocates the cooperation of the various Christian churches on the basis of their common sacraments, moral values, traditions. He urges this most strongly, for, as he says, the dangers from the common enemies of Christianity are so great. He is also in favor of cooperation with all the scattered elements in our society which have the common ideal of freedom.

Now these proposals are undoubtedly good and are of great importance for any Christian renewal; the difficulty arises when one asks how this cooperation is to be effected. I do not think that Mr. Dawson sees with sufficient clarity that this must originate with a revitalized unity within

the visible Church. For if the failure of Catholics to pursue perfection according to Christ's injunction, "Be ye perfect as your heavenly Father is perfect," is the ultimate cause of our present confusion, then any proposed reform must begin with those who by the dictates of their doctrine are obliged to take these words literally. For only the Catholic Church has the necessary means to bring about such a reform, i.e. her doctrine and her sacraments. It is futile to seek a unity with those outside the Church which we do not possess among ourselves; for such a unity would be based, not on the Faith, but upon some human concept commonly held.

A speculative consideration of the question of the visible and invisible Church is certainly not required in a practical work. What is important is to know how to deal with individuals and for this there is only one answer: supernatural prudence is required. From St. Paul we learn that our first concern should be for Catholics: "Therefore while we have time, let us work good to all men, but especially to those of the household of faith" (*Gal.* vi, 10). And elsewhere he says, "our own first." Now this clearly does not exclude cooperation with those outside the Church, but rather facilitates it in two ways: first, the example of the love Catholics bear one another would prompt others, weary of the dissensions of the world, to unite themselves to the Church; secondly, as charity grows within us we shall know how best to deal with those outside. For love has a way of communicating itself and charity has means of persuasion unknown to natural justice. Further if we recognize the extent of our own responsibility for religious division, that too will be communicated to others rather than a self-righteousness which only drives men away. Moreover, it does not seem wise to conceal in any way the fact that Catholics can will nothing less than the conversion of the world to Christ and His Church.

These criticisms are the more difficult to make the more clearly it is seen that Mr. Dawson's purposes are the highest. Moved by that Charity that prompts the Catholic intellectual to use all the intellectual disciplines to bring about a return of the modern world to Christ, he has utilized the matter of history and politics to bring about a reconciliation of the modern world and Catholic doctrine. It is only in the light of this intention that Mr. Dawson's difficulty can be understood. In previous works he has shown that he is well able to analyze and evaluate liberal democracy at its true worth; elsewhere he has given a splendid account of the nature of Christian freedom (cf. *Dublin Review*, July, 1942); hence it is clear that his present treatment of these matters cannot be laid to lack of knowledge. We feel rather that it is owing to a dislike of what might seem self-righteous criticism in time of peril. This could have been avoided if Mr. Dawson had seen the full extent of Catholic responsibility for the crisis, that any criticism of liberal democracy is more truly a criticism of Catholics.



From a theological viewpoint, the modern world is divided between two heresies: one, totalitarianism, denies human freedom in favor of unlimited authority of the state; the other, liberal democracy, exalts human freedom to the status of an absolute principle. This is but a reflection of a deeper problem that has persisted throughout the history of the Church—the reconciliation of the omnipotence of God and the freedom of the human will. The relation between the individual and the state is an imitation of the relation between the individual soul and God, and as one denies, theoretically or practically, the freedom of the will or the omnipotence of God, he will have totalitarianism or liberalism. Once again we can lay the confusion of the modern world on the shoulders of Catholics, for very few Catholics have practically resolved the problem of reconciling the claims of divine omnipotence and free will.

## VI

There would seem to be a basic error at the root of each of the above criticized positions. The author is trying to reconcile Western ideals as they are understood today with Catholic doctrine. Yet in so doing he treats the Church and those forces with which he advocates cooperation as equals. He seems not to see, or, at least, to point out that in any cooperation the Church must take the lead, whether others know it or not. Thus, Mr. Dawson, taking them as equals, effects a merger of the two doctrines to such a degree that neither is recognizable. Liberal democrats will fail to find an expression of their concept of freedom, and Catholics will fail to find any definition of the nature of Christian freedom; there is simply freedom used in an indeterminate and uncritical way, subject to any interpretation the reader wishes to give it. Given the audience for whom the work is intended, there can scarcely be any doubt as to the meaning they will take.

The only reason Mr. Dawson gives for his changed attitude towards liberalism, liberal democracy, humanitarianism, and so forth, is the emergence of the totalitarian threat to all human values, in face of which liberalism must be regarded as an ally. But difficulties to this position arise when one realizes that liberal humanitarianism and the "new paganism" are not essentially diverse, but rather one in principle, for both regard man as ultimate. The new hordes of destruction have merely progressed further along the road, having recognized and accepted the incapacity of the isolated human will to preserve the ideals of freedom and justice. Indeed, Mr. Dawson treats it as a revolution against the false hopes of humanitarianism. "The new revolution is a movement of disintegration and despair which derives its strength from the liquidation of the ideals on which the nineteenth century world had set its hopes."

Accordingly, while every effort should be made to exploit the good in liberal philosophy, indeed, this is a duty incumbent upon Catholic thinkers, cooperation with such a force holds the gravest dangers, as exemplified by the present work; it must be done with the greatest circumspection and with the "wisdom of the serpent."

Above all, such cooperation cannot be of equals. Liberals should be shown that the ideals they still cherish belong properly and originally to Catholic doctrine, which is where the liberals got them from in the first place, and that they can be attained only by the power within the Church. It is undoubtedly the providential meaning behind the collapse of liberal hopes—a proof that of themselves men cannot preserve a just and stable civilization. It is getting to a point where anyone who refuses to recognize this truth can be accused of wilful blindness. Whether Liberals will recognize it or not will prove a test of their good will. Unity with other Christians must be accomplished in a similar way, leading to their conversion and not merely to good fellowship; moreover, such unity can be the fruit of a greater unity within the Church and a further development of doctrine adulterated by our long sojourn in Egypt.

Adverse criticism of this work should not be taken as an indictment of Mr. Dawson's work as a whole. Probably no contemporary writer has performed such valuable services for the Church; we have tried to emphasize that the present work has been criticized only in so far as it departs from his previous works. It seems clear that this work represents the impact of the war upon Mr. Dawson's thought; for this reason it is outside the continuity of his thought and it is to be hoped that he has not adopted permanently the positions he takes here. Much that is good in his other works is present in this one. Most notable of all is his uncompromising insistence upon the extent to which the present crisis must be attributed to spiritual causes and the inadequacy of anything but the power of the Spirit to save our civilization from complete collapse. No writer has shown more powerfully and persuasively the doom which inevitably awaits any culture that places its trust in man rather than in God.

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